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TECHNOLOGY POLICY TASK FORCE INTERIM REPORT

TECHNOLOGY AND HUMAN RESOURCES

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U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.

TECHNOLOGY POLICY TASK FORCE INTERIM REPORT ON TECHNOLOGY AND HUMAN RESOURCES

December 1988

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I. INTRODUCTION

The Technology Policy Task Force of the Committee on Science, Space, and Technology has conducted a study to identify basic problems and make recommendations for the development and application of technology. This interim report discusses issues related to technological change and industrial transition as they apply to the labor force. The report also contains invited papers on these issues from representatives of industry, labor, professional societies, and research organizations. These papers describe changes in American labor markets resulting from technological advances and international competition. They focus on programs for displaced workers including continuing education and retraining programs, engineering education, policies for encouraging domestic production, links between National Laboratories and industry, science and mathematics education, and policies related to increasing proportions of women and minorities in the labor force.

The interim report was prompted by the fact that many American workers have lost their jobs in traditional manufacturing industries. Some of these job losses resulted from the development of new technologies which led to increased productivity in the manufacturing sector. Indeed, technological advances are a mixed blessing. While they have a positive impact on employment and wages for the economy as a whole, they often cause hardships for workers in specific industries.

A number of other changes in the global economy also contributed to job losses in manufacturing:

- decreased product sales, induced initially by the high value of the dollar, which once lost are difficult to reestablish;
- increased competition from other countries;
- the world debt crisis which has resulted in a loss of markets in debtor countries;
- oversupply of certain commodities;
- substitution of products; and
- shifting consumer preferences.

In some of these areas, the conditions may have been caused by factors which were out of U.S. control but to which the nation needs to react. In other cases, internal policies created the problem. Regardless of the cause, these developments have done considerable damage to the labor force in traditional manufacturing fields. Many of the workers who lost their jobs have been absorbed in the job market, but at lower wages; others have remained unemployed for a variety of reasons: inadequate training or education, lack of labor mobility, age, etc. Under the circumstances, there clearly is a need for increased attention to technology applications and innovation, long-term product development, and product quality.

In addressing the issues, the report discusses the interrelationshps between American technology development, manufacturing capabilities, international competitiveness, and a wide range of other factors, as they relate to the labor force. Employment in the United States is closely linked to national economic policy; technological development throughout the world; worker readjustment policies; education and training; and state and local economic development. Some of these factors influence the allocation of financial and human resources, what people will do for a living, for whom they will work, and whether they will have to shift from one sector of the economy to another. Moreover, because technological changes are occurring worldwide and because information is transmitted rapidly around the world, it is essential to address not just what the United States does but how other nations initiate and respond in a competitive world.

The report also provides a summary of a broad range of proposals on industrial transition, technological change, the quality and focus of education, and labor displacement. The discussion considers how we can educate people to be more productive in a high technology society as well as the social costs of industrial transition.

The report points out increasing requirements for technical expertise, particularly in the engineering and manufacturing disciplines. It also discusses the education of our young people, in subjects such as mathematics and science, both to increase their skills in the workplace and to help them participate more wisely in a society confronted by an ever expanding range of materials, innovative applications of technologies, and vastly improved manufacturing methods.

The workforce will be faced with an increasing need to prepare for career changes by participating in continuing education. The report considers programs which would enable workers to move from one type of employment to another. Some of the proposals are designed to provide transitional assistance to workers adversely affected by industrial change. These proposals would adjust the focus of education, retrain displaced workers, or in some manner cope with the pressures on American workers, either by concentrating on industrial declines and shifts directly or by channeling workers' productive energies into areas where they can make a contribution.

The report also recognizes a serious problem in educating the youth in urban areas. Without effective changes in the conditions of urban schools, a significant proportion of our population may lack the skills needed to compete for middle-income jobs in high-technology and information industries. Indeed, "America continues to face the very real possibility of the two separate societies envisioned by the Kerner Commission two decades ago." [1] Compounding the problem is the recent decline in college enrollments of low-income students, particularly among black men.

The purpose of the report is to examine these issues from different perspectives rather than to propose definitive "solutions". The discussion draws on testimony and a range of research and policy analyses. The witnesses and authors are quoted extensively both because their views are well put and because their statements reflect judgments based on significant public policy experience and research. Most of the commentators have spent much of their professional lives working on different aspects of the question of U.S. international competitiveness and its effects on the labor force. They have tried to define the problems and the causes of the transitions and dislocations. They argue we are in a complicated world: Narrowly defined public policies are unlikely to make a significant impact in addressing what are essentially international structural and social changes over which no single nation has control.

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[1] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools*, Princeton, New Jersey, 1988, p. XI.

The commentators have testified and written to encourage greater awareness of others outside the United States. They have described how certain proposed solutions might intensify the problems, not reduce them. They also question "quick fix" interventions.

The report represents different constituencies and different theoretical approaches. It sometimes presents different views about problems or, indeed, where to concentrate attention. But it also reflects a shared understanding of America's role in the global economy and a strong commitment to developing public policies which will increase the technological expertise of American engineers and production workers and alleviate adverse effects of industrial transition.

II. SUMMARY

Technological advances are expected to become increasingly important as the United States faces intense foreign competition both in the U.S. and foreign markets. A society which is unable to offer what the rest of the world wants either because of weaknesses in technology or other factors is likely to face decreased living standards and foreign ownership of its assets.

Industrial Transition.—While the United States retains a leadership position in basic research and technological innovation, it gives less priority than its strongest trading partners to technology applications, product design, and marketing. It is not the quality of the basic research but the transition to product development that creates the problem. U.S. competitiveness will depend increasingly on an ability to apply its research and technical expertise to the development of new products and manufacturing techniques.

Perhaps of greatest concern is the evidence that the U.S. competitive position in high-technology trade is weakening. In the early 1980's, aircraft, computers, and agricultural chemicals accounted for the U.S. surplus. The surplus lasted only until 1983, and by 1984 and 1985 the United States had a deficit in high technology trade.

It is important to distinguish, however, between industrial shifts resulting from abandoning production to others and those which stem from rising productivity. While declines in specific industries clearly contribute to losses in manufacturing employment, the primary factor for the economy as a whole is increased productivity in the manufacturing sector. Indeed, manufacturing is approximately the same proportion of gross national product as it was in 1950, although there has been a considerable decline in the share of manufacturing in employment. This decline has accelerated in recent years as labor has become a significantly lower proportion of total costs. It is the transition across the working life and from one generation to another which needs to be addressed.

Some analysts argue that the increasing share of employment in service industries will not significantly reduce the number of upper-income and middle-income jobs. Others have focused on problems for low-skilled workers who may have increased difficulty finding middle-income jobs

The problem is particularly severe in urban areas. Despite the economic advances for many blacks during the past 35 years, conditions in inner cities have deteriorated largely because of structural changes in the U.S. economy: Traditional manufacturing jobs requiring less than a high school education have declined while jobs requiring more education increased. Blacks with higher education levels were able to take advantage of these new job opportunities, but inner-city blacks with less education often remained unemployed or found jobs only in low-paying occupations.

The report also considers productivity in service industries. While manufacturing productivity has increased, productivity in the service sector, which accounts for 60 percent of what the United States produces, is down. This decrease is contrary to conventional wisdom, which assumes greater productivity, and fewer jobs, with increasing computerization. Indeed, according to some observers, just the opposite has occurred. Service industries have provided a growing number of jobs, in part because they are inefficient. We have been able to maintain an inefficient service sector because there is not yet a strong global market for services. If this market were to increase substantially, low productivity would become a more significant factor in the U.S. competitive position.

Technological Expertise.—Many of the solutions proposed to protect U.S. technology from replication outside the United States are no longer consistent with reality. A number of factors have combined since World War II to increase the integration of the global economy: technological change, increasing communications, rising levels of literacy and productivity throughout the world, freer flow of capital for investment, and increased sovereignty of nations whose development programs are no longer controlled and constrained by a few industrial powers. Thus, efforts to keep U.S. technology within national boundaries may be largely irrelevant to the reality of a global economy. They do not work to deprive the intended recipients of the knowledge and goods they wish to receive.

Losses in our industrial competitiveness, therefore, are unlikely to be recouped by attempts to keep technology within U.S. borders. The point instead is to increase the technological experience of managers, engineers, and production workers so the United States stays on the leading edge of technology and gains experience in turning basic research discoveries into commercial products regardless of where the discoveries occur or who "owns" the company.

In the long-term, the greatest challenge to increasing sales in the global market lies in the education and training of our people. While recognizing the overall strengths of American engineering education, the report emphasizes the need for increased intention to the "practice of engineering." The report also discusses problems in manufacturing which can be attributed to corporate managers who may not have the technological expertise to make difficult choices among emerging technologies—choices that play a major role in international competition.

Our ability to increase the technological expertise of the U.S. labor force also depends on an adequate supply of well-educated high school graduates—the young people who will enter colleges and universities as well as industry. International comparisons of mathematics and science achievement point out weaknesses in American education, although the extent of the problem tends to be overstated. While state and local governments have placed increased emphasis on mathematics and science education, additional reforms in these areas would better prepare students to continue their education in technical fields. The point is to improve course content and teaching skills rather than simply increase course requirements.

A fundamental revision of the American mathematics curriculum, beginning in the early grades of elementary school, is needed.

This revision should include a more focused organization of the subject matter, more emphasis on problem solving, and a broadened curriculum including appropriate courses in geometry, probability and statistics, as well as algebra. Science programs should present a more focused discussion of a limited number of major scientific and technological concepts, with emphasis on practical applications.

Our report also describes the serious problems in urban schools. Because a large number of urban school children are not being properly educated, the United States can anticipate severe social problems. Many who will be "left out" could have become high achievers. A federal program inviting urban school districts to submit bids to establish pilot programs would provide a foundation for future advancements in urban education. A number of programs have shown evidence of making a difference: small school units, magnet schools, college scholarship programs, community support programs, and plans to encourage teacher and principal accountability. These programs constitute one step in addressing a complex problem which goes well beyond the education system. But as part of a broader national focus on inner cities, they would provide information useful to all cities—as well as to states and the federal government—in setting future policies for urban education.

Closely associated with problems in urban education is the recent decline in college enrollments among black youth, particularly men. As a result, many of these young people may not be gaining the education needed to compete for jobs in the workplace of the future. Black high school graduates are increasingly going into the military, attending proprietary schools, or taking jobs. But many are unemployed: Black male teenage unemployment is 34 percent, almost triple the unemployment rate for white males.

The fact that many minority youth come from low-income families living in high crime areas and from poor schools is a major factor in the low college attendance rates. But another may be inadequate funds. Recent decreases in the "real value" of student financial aid and a shift in emphasis from grants to loans may have had unintended consequences for minority enrollment in higher education.

One way of dealing directly with the financial problems of low-income students is to redirect federal aid for loans back to grants. In addition, witnesses before the Task Force made other proposals for financing education and training which circumvented traditional funding methods in an attempt to increase resources. While the report does not take a position on specific alternatives, it emphasizes that high priority be given to public policies which increase the access of low-income students to higher education.

Accelerated Changes in the Workplace.—The technological revolution has accelerated changes in the workplace which will require most people to learn new skills—and sometimes new careers—throughout their lifetime. The workforce will be faced with an increasing need to prepare for career changes by participating in continuing education. The United States has a large, informal system of higher education and training for adults. It is estimated that more than 45 million adult Americans, more than a quarter of the adult population, are currently attending colleges and universities or taking courses sponsored by a range of other organizations—corporations, labor unions, professional associations, and government organizations. Approximately 8 million adults participate in corporate training programs alone.

The report focuses on programs for workers adversely affected by industrial change. Many of the proposals discussed in the report are intended to provide alternatives to special protection by easing the transition through difficult periods. The point is to help displaced workers move into competitive industries rather than attempting to hinder what in many cases are shifts in the manufacturing economy occurring in all industrialized nations.

III. MAJOR ISSUES

1. THE EFFECTS OF TECHNOLOGICAL ADVANCES ON EMPLOYMENT

The Panel on Technology and Employment of the National Academy of Sciences concluded that technological advances have a positive impact on employment and wages for the economy as a whole, although in the short-term these advances may be responsible for worker displacement in specific industries. The panel stressed the importance of developing public policies to address these dislocations.[2]

David C. Mowery, the panel's study director, noted:

> . . . *rather than being a central cause of the problems of unemployment and low earnings growth within this economy, technology is a key part of the solution to these problems.* The U.S. economy faces increasingly intense foreign competition in a number of industries, and the maintenance of high levels of employment and earnings in the face of such competition requires productivity growth, which in turn depends on the rapid development and adoption of new technologies.[3]

Technological advances are expected to become increasingly important as the United States faces intense foreign competition in a number of industries—competition in both the U.S. and non-U.S. markets. Unless the United States can export, we remain at risk that the dollars held outside the United States will not be reinvested in this country except at prohibitively high rates of interest or at unfavorable exchange rates. A society which is unable to offer what the rest of the world wants either because of weaknesses in technology or other factors is likely to face decreased living standards and ownership of its assets at low prices. Robert Z. Lawrence of the Brookings Institution puts it this way:

> . . . the United States has become a world debtor nation. True, the world has been willing to lend to us while we have been engaged in the spending binge. But what we know about the future is at a minimum you have to service your debt. We see it with developing countries today. They have no choice but to learn to export. The same is true of the U.S. looking over the next decade. The issue is whether we are going to do it at a reasonable level of [the]

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[2] Cyert, Richard M. and Mowery, David C., Editors. *Technology and Employment,* Panel on Technology and Employment, Committee on Science, Engineering, and Public Policy, National Academy Press, Washington, D.C. 1987.

[3] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", pp. 83-84.

> dollar or at a dollar that totally undermines our living standards. . . .
>
> And that . . . hinges I think ultimately on our manufacturing sector because that's the dominant source of traded goods in the economy. We are going to have to learn to reverse . . . our picture in trade. And I think ultimately that does rest on technology.[4]

Eli Ginzberg, Hepburn Professor Emeritus of Economics at Columbia University, stresses the importance of technological advances, particularly in civilian industries:

> There is no way for the U.S. to get itself repositioned in the new world economy without heavy reliance on new and better technology. . . . Congress should keep its eye on strengthening our technological base, not restricting it. My own view is that we have a lopsided federal R&D with too much money going into defense.[5]

Changes in the worldwide distribution of technology may require changes in the approach to U.S. technology development. The rate of exchange of scientific and technological knowledge has increased. Therefore, any advantage resulting from knowledge alone must ultimately be related to the creation and marketing of products that others want. Mowery notes:

> . . . the payoff increasingly comes from the embodiment in new products, the adoption in new process technologies, and there may be a role for exploring funding of some of these activities a little further downstream. It certainly has operated fairly effectively in agriculture . . . in aeronautics research . . . in areas of pharmaceuticals.[6]

We do not function in isolation. Industrial competitiveness depends on gaining access to foreign technologies and foreign markets as well as on manufacturing expertise.

Peter F. Drucker of the Claremont Graduate School, notes:

> From now on any country—but also any business, especially a large one—that wants to prosper will have to accept that it is the world economy that leads and that domestic economic policies will succeed only if they strengthen, or at least do not impair, the country's international competitive position. This may be the most important—it surely is the most striking—feature of the changed world economy.[7]

Lawrence puts it this way:

> I think there is an abysmal ignorance about the state of technology in the rest of the world, the degree to which in many areas foreigners have overtaken us. . . . what [can we] do to give our workforce a global perspective? What do

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[4] Ibid., p. 146.

[5] Ibid., p. 151.

[6] Ibid., p. 144.

[7] Drucker, Peter F. "The Changed World Economy", *Foreign Affairs*, Spring, 1986, pp. 769–791.

> we do to encourage people to travel? What do we do to encourage people to obtain language skills? . . . we have now the advantage of being in a sense number two in certain areas. We don't have to innovate totally. We can copy. We have learned that in our auto industry as the Japanese have moved in bringing with them the superior management techniques. But I think that exploiting this capacity to learn from others rather than to innovate and do it all alone is something that is going to be more open to us as, indeed, we become closer to a situation of first among equals, if you will, rather than this dominant technological giant.[8]

There is a basic dilemma. Technological advances are a mixed blessing. Although they contribute to employment and wage growth for the economy as a whole, they often cause hardships for individuals in specific industries. Mowery stressed the importance of developing public policies to address these dislocations:

> . . . technological change does, has had, and will continue to have severe consequences on the employment prospects for individuals in specific occupations and specific industries. But the impacts, by and large, are sectoral rather than aggregate. Therefore, the role, in the panel's view, of adjustment policies adopted by the public and private sectors, is to facilitate the movement of workers and resources from declining to expanding sectors.[9]

As Ginzberg put it:

> . . . all you have to do is look at American agriculture and realize that technology in the larger sweep of things brought the labor force down from 90 percent of the total labor force in agriculture to three percent or below.[10]

These transitions are likely to be gradual. They almost have to be as society tries to cope with the dislocations, the lack of labor mobility, the start-up time for new industries to become mainstream, the shifts required in the education system. Mowery describes the parallel process of the changing technology over time:

> *The employment impacts of technological change typically occur gradually by comparison with other sources of economic change.* Although scientific discovery may and often does occur rapidly or discontinuously, realization of the employment effects of technological change requires the widespread adoption of new technologies, which depends on the relatively gradual processes of investment in and "debugging" of new technologies.[11]

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[8] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", p. 147.

[9] Ibid., pp. 79–80.

[10] Ibid., p. 2.

[11] Ibid.

2. MANUFACTURING AND EMPLOYMENT

There is concern over the loss of jobs in the U.S. manufacturing sector. It has been argued that the United States is losing its industrial base and that its ability to apply technology to consumer products has "fallen behind". Indeed, it is widely believed these events contribute to the significant U.S. trade deficit.

While the overall share of manufacturing in gross national product has not decreased, it certainly is true that some of America's export industries have encountered serious problems. Lynn Williams, President of the United Steel Workers of America, notes:

> If you take out of what we're manufacturing, if you take the military piece out of it, that's what worries a great many of us so much. You take the military piece out of it and leave the commercial piece, and then you get a much clearer picture of how we are deindustrializing in terms of our ability to compete in this global economy and to really produce goods and have them out there in this global economy. This situation is much grimmer and much more difficult.[12]

Defense spending accounted for 6.6 percent of GNP in the United States in 1986, but it accounted for a considerably higher percentage of the products and services in some areas of the country. Defense accounted for about 9.3 percent of GNP in California, for example. The same imbalance was found among industries. The California Commission on State Finance found:

> The effects of defense spending on California's key manufacturing industries are considerably more important. For example, defense spending accounts for about 16.3 percent of total manufacturing output, and a much higher 55.8 percent of output in the aerospace industry, 38.9 percent in the communications and electrical equipment industry, and 22 percent of electronic components and semiconductor production in this state.[13]

At the same time, the U.S. balance of trade in high technology goods like computers, communications equipment and scientific instruments turned negative, for the first time, in 1986. Indeed, Japanese microelectronics are now used in many American products including telecommunications equipment, automobiles, and advanced weapons systems. Robert B. Reich of the John F. Kennedy School of Government notes:

> On the basis of data supplied by the Board of Army Science and Technology and the International Trade Commission, I estimate that 40 percent, by value, of the advanced electronics finding their way into American weapons systems are now coming from Japan. If the present trend continues, the proportion will rise to 55 percent within 5 years. A substantial portion of the advanced electronics for Star Wars will be produced in Japan.

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[12] Ibid., p. 123.

[13] Rauch, Jonathan. "After the Boom", *National Journal*, December 19, 1987, pp. 3193–3198.

> In many cases American companies that were on the leading edge of microelectronics several years ago have simply dropped out of the running. With the costs of perfecting each new generation of technology escalating rapidly, and the time interval during which the investment can be recouped growing shorter, the price of staying in the race has often become too high relative to the return. A world-class factory for fabricating semiconductors now costs around $200 million. By 1995, when x-ray lithography will be used to fabricate semiconductors, the cost will be $1 billion. . . .
>
> In 1980 fifteen American companies, all of them profitable, were producing most of the world's memory chips, and American companies produced most of the components and equipment for making chips. By now most American producers of chip-making equipment have closed up shop. Only three American chip makers are still selling their wares on the open market, and all are hemorrhaging red ink. In 1986 American chip makers lost approximately $800 million. Since 1981 they have laid off 65,000 workers. Erich Bloch, the Director of the National Science Foundation, says, "The [American chip] industry is going downhill at a faster rate than anybody ever thought possible".[14]

Stephen S. Cohen and John Zysman of the University of California at Berkeley also present evidence to show that America's competitive position in high technology trade may be weakening. If that is the case, it implies that there are weaknesses in the U.S. manufacturing sector in technology applications and marketing:

> In the early eighties the range of high-technology sectors from which a surplus was generated was actually quite narrow: aircraft, computers, and agricultural chemicals. The overall high-tech surplus disappeared by 1983, and in 1984 and 1985 high technology, too, ran a growing deficit. Moreover, a substantial portion of U.S. high-tech exports are military goods, which indicates more about the character of America's strategic ties than about its industrial competitiveness. At a minimum, military sales reflect such factors as foreign policy far more than simple commercial calculus.
>
> Like the service industries, much of high tech is tightly linked to traditional manufacturing. Most high-tech products are producer goods, not consumer items, despite the popularity of home consumer items, despite the popularity of home computers and burglar alarms. They are bought to be used in the products of other industries (such as microprocessors in cars) or in production processes (such as robots, computers, and lasers). If American producers of autos, machine tools, telephones, and trousers don't buy American-made silicon chips, who will?

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[14] Reich, Robert A. "The Rise of Techno-Nationalism", *The Atlantic Monthly*, May 1987, pp. 63–69.

> A second tie to manufacturing is even tighter. If high tech is to sustain a scale of activity sufficient to matter, America must control the production of those high-tech products it invents and designs—and it must do so in a direct and hands-on way. Unless R&D is closely tied to manufacturing—and to the innovation required to maintain competitiveness—it will lose its cutting edge. For example, by abandoning the production of televisions, the U.S. electronics industry quickly lost the know-how to design, develop, refine, and competitively produce the VCR, the next generation of that product.

Moreover, any losses in manufacturing also would reduce service industries tightly linked to manufacturing, although it is difficult to project the actual extent of the losses:

> Many service jobs that follow manufacturing, such as wholesaling, retailing, and advertising, would not be directly affected if manufacturing were ceded to offshore producers. The same sales effort is involved in selling a Toyota as in selling a Buick.
>
> The services that are directly linked to manufacturing are concentrated in that relatively narrow band of services that precedes it. Examples of such activities include design and engineering services; payroll, inventory, and accounting services; finance and insurance; repair and maintenance of plant and machinery; training and recruitment; testing services and labs; industrial waste disposal; and the accountants, designers, publicists, payroll, transportation, and communication firms who work for the engineering firms that design and service production equipment.[15]

Losses in manufacturing—particularly in industries where the use of technology contributes either to the quality or cost of the product to an international consumer—also would substantially reduce U.S. exports. Relatively few American jobs depend on international trade in services. OTA notes:

> Not only does domestic production of services greatly exceed exports and imports of services, but U.S.-based service firms do more overseas business through foreign affiliates than through direct exporting. Investment abroad means jobs in foreign countries. [And foreign investment in the U.S. means jobs here.] Almost certainly services embodied in U.S. goods exports contribute more to U.S. employment than do exports of services.[16]

Manufacturing Productivity and Manufacturing Employment.—Although manufacturing is approximately the same proportion of gross national product as it was in 1950, there has been a considerable decline in the share of manufacturing in employment in the U.S. economy. Manufacturing accounted for 30.8 percent of employment in 1960, 22.4 percent in 1980 and 19.9 percent in 1985 (although the absolute number of Americans working in manufacturing industries has remained roughly constant at 20 million for the past 15 years). While declines in specific industries clearly contribute to the statistics on manufacturing employment, the primary factor for the economy as a whole is increased productivity in the manufacturing sector. Lawrence notes that "the decline in share of employment results not from "a loss of our ability to produce goods," but from "our enhanced ability to produce goods. More rapid productivity growth in the goods productive sector has been the dominant reason for the share of manufacturing in our employment." [17]

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[15] Cohen, Stephen S. and Zysman, John. "The Myth of a Post-Industrial Economy", *Technology Review,* February/March 1987, pp. 59–62.

[16] U.S. Congress, Office of Technology Assessment. *International Competition in Services,* July 1987, p. 5.

Drucker describes this "uncoupling of manufacturing production from manufacturing employment" as a major change in the world economy. Again a dilemma: The loss of some blue collar jobs in America is evidence of increased productivity. It is the transition across the working life and from one generation to another which needs to be addressed:

> Increased manufacturing production in developed countries has actually come to mean *decreasing* blue-collar employment. As a consequence, labor costs are becoming less and less important as a "comparative cost" and as a factor in competition.
>
> . . . The trend itself is not new. In the 1920s one out of every three Americans in the labor force was a blue-collar worker in manufacturing. In the 1950s the figure was one in four. It now is down to one in every six—and dropping. While the trend has been running for a long time, it has lately accelerated to the point where—in peacetime at least—no increase in manufacturing production, no matter how large, is likely to reverse the long-term decline in the number of blue-collar jobs in manufacturing or in their proportion of the labor force.
>
> This trend is the same in all developed countries, and is, indeed, even more pronounced in Japan. It is therefore highly probable that in 25 years developed countries such as the United States and Japan will employ no larger a proportion of the labor force in manufacturing than developed countries now employ in farming—at most, ten percent. Today the United States employs around 18 million people in blue-collar jobs in manufacturing industries. By 2010, the number is likely to be no more than 12 million. In some major industries the drop will be even sharper. It is quite unrealistic, for instance, to expect that the American automobile industry will employ more than one-third of its present blue-collar force 25 years hence, even though production might be 50 percent higher.
>
> . . . a country, an industry or a company that puts the preservation of blue-collar manufacturing jobs ahead of international competitiveness (which implies a steady

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[17] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force," p. 24.

> shrinkage of such jobs) will soon have neither production nor jobs. The attempt to preserve such blue-collar jobs is actually a prescription for unemployment.
>
> . . . what confuses the issue even more is that the United States is experiencing several separate and different shifts in the manufacturing economy. One is the acceleration of the substitution of knowledge and capital for manual labor. Where we spoke of mechanization a few decades ago, we now speak of "robotization" or "automation." This is actually more a change in terminology than a change in reality. When Henry Ford introduced the assembly line in 1909, he cut the number of man-hours required to produce a motor car by some 80 percent in two or three years—far more than anyone expects to result from even the most complete robotization. But there is no doubt that we are facing a new, sharp acceleration in the replacement of manual workers by machines—that is, by the products of knowledge.
>
> A second development—and in the long run this may be even more important—is the shift from industries that were primarily labor-intensive to industries that, from the beginning, are knowledge-intensive. The manufacturing costs of the semiconductor microchip are about 70 percent knowledge—that is research, development and testing—and no more than 12 percent labor. Similarly with prescription drugs, labor represents no more than 15 percent, with knowledge representing almost 50 percent. By contrast, in the most fully robotized automobile plant labor would still account for 20 to 25 percent of the costs.[18]

Drucker also notes that unlike European unions, "America's unions have shown an amazing willingness to make sizable concessions on wages—and even on work rules—to prevent plant closing and massive layoffs." [19] In his view, the problem of reduced labor requirements in traditional industries is "soluble if an economy becomes entrepreneurial." Entrepreneurship and innovation must occur "way down and close to the events" and therefore are inconsistent with central planning:

> . . . the new businesses of the entrepreneurial economy create new jobs, as has been happening in the United States during the last ten years (which explains why the massive unemployment in the old "smokestack industries" has caused so little political trouble so far in the United States and has not even triggered a massive protectionist reaction). But even if an entrepreneurial economy creates the new jobs, there is need for organized efforts to train and place the redundant former "smokestack" workers—they cannot do it by themselves.

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[18] Drucker, Peter F. "The Changed World Economy," *Foreign Affairs*, Spring, 1986, pp. 769-791.

[19] Drucker, Peter F. "The Rise and Fall of the Blue-Collar Worker," *The Wall Street Journal*, April 22, 1987, p. 32.

> . . . Planning as the term is commonly understood is actually incompatible with an entrepreneurial society and economy. Innovation does indeed need to be purposeful and entrepreneurship has to be managed. But innovation, almost by definition, has to be decentralized, ad hoc, autonomous, specific, and micro-economic. It had better start small, tentative, flexible. Indeed, the opportunities for innovation are found, on the whole, only way down and close to events. They are not to be found in the massive aggregates with which the planner deals of necessity, but in the deviations therefrom. . . .[20]

U.S. Industrial Practices.—While current pressures on American workers are closely related to shifts in the manufacturing economy which are occurring in all industralized countries, they also result from weaknesses in manufacturing in some U.S. industries. The United States retains a leadership position in basic research and technological innovation, but gives less priority than some of its trading partners to technology applications, product quality and marketing. It is not the quality of the basic research but the transition to product development that creates the problem. Weaknesses in American manufacturing have become more visible in recent years as foreign competition increases. Ginzberg puts it this way:

> I said [to the head of GM in 1972], what the hell are you doing about small cars and imports? He said, we're doing nothing. Americans love big cars and we don't think this is anything, just some yuppies who are interested in it. . . .
>
> If you don't know how to manage your resources—steel is an outstanding example of what they didn't know what they were doing for 25 years.
>
> Now, it's too simple to simply say that there's something going on over there. We got into very bad practices in this country. From 1945 to 1965 we had no competition. And we thought we were good. In fact, we were lousy. That's a really very tough concept to get, and we're working ourselves out very slowly, very slowly.[21]

Indeed, anecdotal evidence suggests that many American firms are taking steps to improve manufacturing and increase market access. *U.S. News & World Report* summarizes some recent trends:

> . . . scores of U.S. companies, from multinationals such as IBM and Coca-Cola to one-person shoebox operations, are taking on the Japanese, often in Japan itself and are winning. . . . As the soaring yen lends a price advantage to dollar-priced goods, hundreds more American firms are venturing into Japan. One sign: 185 American concerns set up manufacturing or sales arms in Japan in 1985, according to Mitsubishi Bank, compared with 70 in 1980. . . . While the lower dollar can make even mediocre American

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[20] Drucker, Peter F. *Innovation and Entrepreneurship: Practice and Principles,* New York, Harper & Row, 1985, pp. 253–260.

[21] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", p. 124.

> firms look good, there are signs that many companies are more competitive. U.S. manufacturers—many of whom have gone through severe belt tightening—have become more productive. In 1986, the United States recorded the highest rate of increase in productivity among industrialized nations, 3.5 percent—higher than Japan's for only the third time since 1970. And American labor costs, one of the best measures of whether or not U.S. products are more competitive, have been growing more slowly in the past two years then Japan's.[22]

At the same time, many companies are beginning to change their operating procedures, for example by giving workers knowledge and incentives to make high quality products, by adapting more quickly to change, or by putting more emphasis on marketing or packaging.

Engineering Research and Education.—There also is increased attention to promoting engineering research and education that will assist in meeting future needs of American industry.

For example, the engineering research centers funded by the National Science Foundation (NSF) are intended to increase collaborative research between universities and industry so research findings will be more directly relevent to industrial needs. Dale W. Compton, Senior Fellow at the National Academy of Engineering, notes:

> The problems that justified the creation of the Centers in 1984 still exist. In fact, the concept may be more important today than it was in 1984. We need these Centers to grow and to flourish. Thus, there is strong incentive to learn everything that we can from this experiment and to try to optimize the chances for its success and to then build upon that success in new and better ways. And an important part of the learning process is to recognize the challenges that must be faced and to be certain that we are properly addressing them. Most important are (1) creating incentives to encourage faculty from different disciplines to work together in a university environment; (2) creating incentives for university faculty to gain knowledge about industrial practices without giving up their primary mission of education and research; and (3) creating incentives for univesities and industry to work together to create "usable knowldge." [23]

Indeed, as Nam Suh, former head of NSF's Engineering Directorate notes, it is important for centers to have "vision", that is "simply knowing where they are going and why." [24] In this context, William Brinkman of AT&T Bell Laboratories stresses the importance of setting clear and realistic research goals directed toward a specific technology and providing sufficient rsources to conduct research which is at the "cutting edge". [25]

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[22] Work, Clemens P. *et al*, "How to Beat the Japanese", *U.S. News & World Report*, August 24, 1987, pp. 38–45.

[23] Compton, Dale W. "The Engineering Research Centers; Are We Prepared for the Challenges?" Systems Research Center, The University of Maryland, September 29, 1986, pp. 1–6.

[24] Suh, Nam P. "The ERCs: What We Have Learned", *Engineering Education*, October 1987, pp. 16–18.

There also is increased emphasis on the importance of training engineers to design and manage the production process. Joseph Froomkin, President, Joseph Froomkin, Inc., sets forth the problem:

> Getting good ideas to work (be they new products or improvements in the production process which cut costs and increase productivity) depends on the training we provide to people charged with originating and implementing new projects. The engineer is the most important link in this process. Lately, considerable dissatisfaction has been voiced about the orientation and training of engineers. The curriculum of engineering schools is criticized by some who claim the training given to engineers is too theoretical and by others who claim that it is not theoretical enough. Both groups agree that the skills of young graduates do not match the requirements of the market place.
>
> At the root of the controversy are the different career paths for engineers envisaged by the critics. The prestige schools train young people to be analytical and conversant with modern theories in the sciences. They graduate students who either gravitate to the research and development field or, after completing a graduate degree in business administration or law, get jobs outside of the narrow engineering fields. Other, less selective schools whose faculty is often recruited from graduates in the prestigious institutions, try to replicate these programs with varying success. Because there are many types of engineers (mechanical, electrical, chemical, etc.) and schools with different orientations, it is dangerous to make generalizations about recent graduates. Nevertheless, a number of suggestions by employers of engineers recur often enough to be repeated.
>
> With the exception of chemical engineers, most engineering school graduates have little experience with either apparatus or practical problems. The elite engineering schools, and those which aspire to be highly regarded by their academic peers, devote much less time to practical engineering aspects than they did thirty or forty years ago. The training of their graduates fits quite well with the work of research and development groups where engineers are supported by paraprofessionals.
>
> By contrast, newly-graduated engineers who work in production are not trained to deal with the problems encountered routinely on the factory floor. Many never learn how to handle them. This is one of the explanations for the high attrition rates among engineering graduates who opt out of the field and choose other occupations—their

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[25] Brinkman, William F. Comments at a symposium entitled, "Industrial Research and Development Strategies and U.S. Technological Leadership", hosted by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, sponsored by Polaroid Corporation, November 10, 1987.

> school training did not give them any preparation for the tasks which they are asked to accomplish.
>
> A frequently mentioned stumbling block on the way to improving producting processes in American industry is the trend for many engineers to be located far away from the shop floor. They work at data processing terminals, scheduling production and checking on its progress. They are not exposed to the problems of workers and not challenged to do the small marginal improvements which rationalize and cut costs in making a product.
>
> In Japan or Germany, where the automation of paperwork and the use of data processing are not as pervasive as in the United States, the locus of work of engineering staffs is quite different. In these countries the majority of engineers get the opportunity to dirty their hands by being stationed closer to workers. They observe the production process, interact with people on the production line, and either work jointly or suggest small fixes which raise the productivity of workers or the quality of the product, or both.
>
> Another reason why our products do not get designed as well as they should be is that production and development engineers have separate career paths. Large Japanese and German companies start out their engineers in production and only later promote them to research and development staffs, ensuring that designs are made by persons familiar with the day-to-day problems of pushing a product out of the door.
>
> Despite all its shortcomings, the American organization of engineering staffs is not without its advantages: it enables companies to adopt some productive innovative techniques more rapidly. The recent experience with CAD/CAM is a case in point. Our engineers have more experience using computers than those in foreign countries and are far ahead of the rest of the world in designing products with the aid of computers.[26]

The National Research Council, while emphasizing the overall strengths of American engineering education, also suggests the need for more emphasis on practical courses:

> The committee found a widespread opinion within industry that the competence of recently graduated engineers is higher than ever before. There is no evidence of a serious flaw in the basic technical education of entry-level engineers. On the contrary, the new engineers have strong analytical skills and an excellent theoretical base in engineering science. However, most companies find that the contemporary graduate lacks the ability to step into a job and become immediately productive. Although this is not a new problem, it has been exacerbated by the trend toward

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[26] Froomkin, Joseph. "New Initiatives to Restore Competitiveness", prepared for the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, August 6, 1987, pp. 1-10.

> fewer design or practice courses. Often, additional training of six months to a year or more is required to acclimate the new engineer properly to the requirements of the job. Some aspects of this in-house training are simply specific to a given company (procedures, special products and terminologies, etc.) and as such are unavoidable. Other aspects are industry-specific, or involve bringing the engineer up to the state of the art in the industry. Offering this training is a particular problem for smaller companies because of its cost.

Contrary to conventional wisdom, the need for a more practical orientation does not result from an imbalance between the relative numbers of engineers and technicians: Regardless of the relative distribution of educational levels, the system seems to find the most appropriate balance via market mechanisms. Thus there is no need to redress the technician/technologist/engineer balance.[27]

Some of the problems in American industry also can be attributed to corporate managers who may not have the technical expertise to make difficult choices among emerging technologies—choices that play a major role in international competition. Lester C. Thurow, Dean of MIT's Sloan School of Management notes:

> There also is an open question as to whether American managers have lost contact with the technologies they are supposed to be managing. Compared with the rest of the industrial world, more American managers come up through nonproduction jobs in law, accounting or marketing—far fewer have a technological background than in either Europe or Japan. These nontechnical managers may understand the technologies being employed by their firms, but they don't have enough background to develop intuitions on which of the possible technologies now on the horizon are apt to further develop and which are apt to be discarded.
>
> As a result, incumbent managers have no way to judge the merits of revolutionary changes in production technologies. So they procrastinate, waiting for it to become clear which technology is the best. By the time the answer is clear, foreign firms may have a two- to three-year lead in understanding and employing those new technologies.[28]

3. TECHNICAL SKILLS AND EMPLOYMENT IN THE SERVICE SECTOR

Since the early 1950's, the proportion of Americans employed in service industries has increased steadily. There is no disagreement among observers that the decreasing share of employment in manufacturing has produced worker and community dislocations which require government attention. However, there are different views about the extent to which the economy as a whole will continue to support jobs with incomes comparable to those lost in declining industries.

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[27] Committee on the Education and Utilization of the Engineer, Commission on Engineering and Technical Systems, National Research Council. *Engineering Education and Practice in the United States: Foundations of Our Techno-Economic Future,* National Academy Press, Washington, DC., 1985, pp. 1-17.

[28] Thurow, Lester C. "The Task at Hand", *The Wall Street Journal,* June 12, 1987, p. 46D.

Implications for Future Job Opportunities.—A number of analysts focused on problems associated with the growing number of jobs in service industries. First, many displaced workers in traditional industries are not finding equivalent jobs in other parts of the economy. Williams concludes this income loss is more than a temporary problem of industrial transition:

> . . . the loss of these basic industries jobs is not being replaced by comparable income level jobs in the service sectors . . . Actually, we are witnessing the downgrading of the standard of living not only of currently displaced blue-collar workers, but freezing of future income opportunities for new workers.[29]

Ginzberg reaches similar conclusions:

> Those in high wage industries with good union contracts will have great difficulty in finding equivalent jobs in an increasing white collar economy.[30]

Second, individuals who do not have minimum educational competencies are expected to have increasing difficulties finding jobs. Ginzberg notes:

> I believe that the shift to the service economy, which is continuing to accelerate, where we now have three out of every four jobs in services, means that if one does not have minimum qualifying educational competencies, one is going to be out of that labor market.
>
> I begin to see in New York, Chicago, L.A. and many other places a serious danger to the stability of the society—not [just] to the individuals of the society—of having youngsters coming of working age who lack the minimum qualifications to get employed in the new service economy.
>
> We have all kinds of jobs in New York. We've had 400,000 jobs since our low point in 1977. But we have to import most of those people from other parts of the United States and from abroad. That is a very serious matter.[31]

In his recent book, *The Truly Disadvantaged,* William Julius Wilson of the University of Chicago hypothesizes that despite the economic advances for many blacks during the past 35 years, conditions in inner city ghettos have deteriorated largely because of structural changes in the U.S. economy: Traditional manufacturing jobs requiring less than a high school education have declined while jobs requiring more education increased. Blacks with higher education levels were able to take advantage of these new job opportunities but inner-city blacks with less education often remained unemployed or found jobs only in low-paying occupations.[32]

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[29] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", pp. 20-21.

[30] Ibid., p. 4.

[31] Ibid., p. 3.

[32] Wilson, William Julius. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy,* University of Chicago Press, Chicago, Illinois, 1987 and Greenstein, Robert. "Prisoners of the Economy", *The New York Times Book Review,* October 25, 1987, pp. 1, 46-47.

John D. Kasarda of the University of North Carolina presented similar testimony:

> So different are the skills used and education required in these growing vs declining urban industrial sectors that adaptation by the displaced is exceedingly difficult. This difficulty is concretely represented in the exceptionally high unemployment rates of those central city residents who have not completed high school, regardless of race, and the widening gap over time in central city unemployment rates between the poorly and better educated.

Table 1 illustrates employment losses and gains in some of the nation's oldest and largest cities. Each of the cities experienced substantial employment declines in manufacturing, retail and wholesale trade, and blue collar services, while white collar employment expanded substantially.

Table 2 shows the rising education requirements in each of the cities which resulted from job losses in industries with lower education requirements. For example, New York City lost 492,000 jobs between 1970 and 1984 in industries where the average worker had not completed high school and added 239,000 jobs in those industries where average workers had some higher education.

TABLE 1.—CENTRAL-CITY EMPLOYMENT

[In thousands, by sector, 1953, 1970, 1984]

Central city and sector	1953		1970		1984	
	Number	Percent	Number	Percent	Number	Percent
New York City:						
Total employment [1]	2,977	100.0	3,350	100.0	2,976	100.0
Manufacturing	1,070	35.9	864	25.8	488	16.6
Retail/wholesale	805	27.1	779	23.3	579	19.8
White-collar services [2]	646	21.7	1,172	35.0	1,445	49.4
Blue-collar services [3]	344	11.6	424	12.6	289	9.9
Other	111	3.7	112	3.3	127	4.3
Philadelphia:						
Total employment [1]	788	100.0	772	100.0	593	100.0
Manufacturing	359	45.5	257	33.3	115	19.4
Retail/wholesale	206	26.1	180	23.3	130	21.9
White-collar services [2]	98	12.5	220	28.5	276	46.5
Blue-collar services [3]	85	10.8	81	10.5	50	8.4
Other	40	5.1	35	4.5	22	3.7
Boston:						
Total employment [1]	402	100.0	465	100.0	481	100.0
Manufacturing	114	28.4	84	18.1	49	10.2
Retail/wholesale	132	32.8	111	23.9	84	17.5
White-collar services [2]	87	21.7	194	41.6	279	58.0
Blue-collar services [3]	51	12.6	55	11.7	47	9.7
Other	18	4.4	21	4.6	22	4.6
Baltimore City:						
Total employment [1]	342	100.0	367	100.0	302	100.0
Manufacturing	130	38.1	105	28.6	55	18.2
Retail/wholesale	89	26.1	94	25.5	68	22.4
White-collar services [2]	44	12.8	108	29.5	128	42.4
Blue-collar services [3]	51	14.9	44	12.1	32	10.5
Other	28	8.1	16	4.2	20	6.5

TABLE 1.—CENTRAL-CITY EMPLOYMENT—Continued

[In thousands, by sector, 1953, 1970, 1984]

Central city and sector	1953		1970		1984	
	Number	Percent	Number	Percent	Number	Percent
St. Louis City:						
Total employment [1]	431	100.0	376	100.0	259	100.0
Manufacturing	194	44.9	133	35.3	67	25.9
Retail/wholesale	103	23.9	89	23.6	54	20.8
White-collar services [2]	50	11.5	96	25.5	101	39.0
Blue-collar services [3]	46	10.6	44	11.8	26	10.0
Other	39	9.1	14	3.8	11	4.2

[1] Total classified employment and industry subcategories exclude government employees and sole proprietors.

[2] Service industries (excluding government, retail, and wholesale) in which more than one-half the employees hold executive, managerial, professional or clerical positions.

[3] Service industries (excluding government, retail, and wholesale) in which fewer than one-half the employees hold executive, managerial, professional or clerical positions.

Sources: U.S. Bureau of the Census, County Business Patterns, 1953, 1970, 1984, and 1970 Occupation by Industry statistics.

TABLE 2.—CENTRAL CITY JOBS IN INDUSTRIES, BY MEAN EDUCATION OF EMPLOYEES, 1959, 1970, 1984

[Figures in thousands]

City and education mean of industry	Number of jobs			Change	
	1959	1970	1984	1959–70	1970–84
New York:					
Less than high school	1,499	1,445	953	−4	−492
Some higher education	682	1,002	1,241	320	239
Philadelphia:					
Less than high school	434	396	224	−38	−172
Some higher education	135	205	244	70	39
Boston:					
Less than high school	176	168	124	−8	−44
Some higher education	117	185	252	68	67
Baltimore:					
Less than high school	215	187	114	−28	−73
Some higher education	59	90	105	31	15
St. Louis:					
Less than high school	207	197	108	−10	−89
Some higher education	61	98	96	37	−2

Source: Bureau of the Census Country Business Patterns and Current Population Survey machine readable files.

Kasarda notes:

> The minority proportions of all cities increased between 1970 and 1980. . . . minorities are at structural disadvantage in cities losing blue-collar and other entry-level jobs because substantially larger proportions of these minorities lack the necessary schooling to participate in new urban growth industries. . . . One finds a precipitous rise in unemployment rates between 1969 and 1982 for those who have not completed high school. Within central cities in the Northeast and Midwest, unemployment rates of black males without a high school degree exceeded 30 percent in 1985. Indeed, for blacks in northeastern cities who lack a high school degree, the national economic recovery since 1982 has had no effect, with black male unemploy-

> ment rates actually increasing from 26.2 percent in 1982 to 30.4 percent in 1985.
>
> Moreover, if the residents of the Sunbelt cities do not achieve the education levels for the knowledge-intensive employment that is sure to grow in all cities as we approach the 21st century, they too will face structural unemployment as severe as that now faced by poorly educated residents in northeastern and midwestern cities.
>
> The sobering dimensions of the future problem can already be seen in the analogous high school dropout rates between New York and Los Angeles. The fact that four out of ten students are not completing high school is extremely worrisome, for it comes at a time when not only the high school degree is required, but education beyond high school is needed to prosper in the urban job market.
>
> Education-job opportunity problems will not be confined to metropolitan areas. Much of the rural population of the South remains poorly educated. Even rural jobs which required little education in the past are likely to demand greater education in the future. This is clearly seen in the transformation of agriculture during the past 40 years. The small, labor-intensive farm has given way to technologically sophisticated, capital-intensive agro-business. Today, the most financially successful farmers have developed skills in agronomy, animal husbandry, financial planning, and marketing.
>
> With growing global competition in manufacturing from low-wage, labor-surplus nations, the rural South can no longer compete on the basis of wages and limited unionization. Competitiveness of southern manufacturing will increasingly depend on the region providing a better-educated labor force capable of adapting to and utilizing advanced technologies.[33]

Although the growth in information industries has increased general education requirements, there is little evidence to suggest that *technical* skill requirements are significantly increased by the computerization of these industries. Mowery puts it this way:

> . . . technologies over the course of their development [tend] . . . to reduce their skill requirements for operation. If you compare mainframe computers of the early 1950's with the desktop personal computers of the mid-1980's, I think you'll find that the skill requirements for operation have declined rather dramatically.
>
> So we don't see a need for a radical upgrading, for example, in computer literacy of the U.S. population as a whole in order to obtain quality entry level jobs. What the panel does find is that basic skills of literacy, numerical reasoning, problem solving, written communication, are and . . .

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[33] Field hearing before Subcommittee on Science, Research and Technology of the Committee on Science, Space, and Technology, 100th Congress, First Session, Research Triangle Park, North Carolina, November 9, 1987 (No. 95). "Scientific and Technical Literacy in the Workforce", pp. 108–124.

> probably will become more important for labor force entrants to obtain quality jobs in the work place of the future. And the lack of basic skills within a significant portion of the experienced displaced worker population constitutes a serious problem for adjustment policy. . . . Estimates range as high as 20 to 30 percent of experienced displaced workers have serious deficiences in basic skills.
>
> However, Mowery did not "find compelling evidence to suggest that the recent technological change has had any relationship to changes in the household income distribution within this economy" or on "polarizing the structure of the workforce: that is to say, creating a two-tiered workforce." [34]

Nor does he anticipate negative consequences of technological change for women and minority workers:

> . . . any projected adverse consequences of such change are very small, and are dwarfed by projections of overall growth in employment opportunities. Nonetheless, affirmative action and other policies to combat racial and sexual discrimination in the workplace are among the most effective to reduce any disproportionate adjustment burden borne by these groups . . . In addition, policies to strengthen the quality of basic skills preparation for labor force entrants from minority groups are important in improving the ability of these individuals to obtain good jobs in the future workplace.
>
> In general, the projected deceleration of labor force growth between 1984 and 1995 "should improve the employment prospects for labor force entrants".[35]

Finally, Lawrence argues that the increasing share of employment in services will not significantly reduce the number of upper-income and middle-income jobs. He concludes that public policy should not try to hinder industrial transitions, but should try to help displaced workers move into competitive industries:

> The process of economic development is often referred to as industrialization, but judged by employment patterns it could be more accurately described as a transition to services. Even during the early period of U.S. industrialization, for example, employment in services increased as rapidly as employment in goods-producing industries.
>
> This shift will continue in the next decade. According to U.S. Department of Labor projections in 1995, 74.4 percent of the American labor force will produce services (compared with 72.3 percent in 1984) while only 17.2 percent will be employed in manufacturing . . .
>
> As shown in Table 3, "the proportion of full-time workers with middle-class earnings in the production of goods is exactly the same as the proportion of workers with middle-

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[34] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", p. 80.

[35] Ibid., pp. 85, 87.

class earnings in the rest of the economy—46 percent. Durable goods manufacturing does rank second among all sectors in the proportion of its workers receiving middle-class earnings (50 percent). However, the public sector has the most intensively middle-class work force (55 percent), and in third place is the services sector: transportation, communications and public utilities (49 percent). There is virtually no difference between the proportions of middle-class earnings in nondurable manufacturing (44 percent), finance (43 percent), and miscellaneous services (43 percent)."

TABLE 3.—EARNINGS DISTRIBUTION ACROSS SECTORS, CATEGORIZED BY HIGH, MIDDLE AND LOW EARNINGS, 1969, 1983 [1]

[In percent]

Sector	Distribution in 1969								
	Total			Males			Females		
	High	Mid	Low	High	Mid	Low	High	Mid	Low
Total	20	50	30	28	56	16	5	39	56
Goods producing	21	53	26	26	58	16	2	38	60
Agriculture	5	25	70	6	26	68	0	16	84
Mining	32	52	15	35	52	13	1	56	44
Construction	32	50	18	33	49	17	5	57	38
Manufacturing	20	55	25	26	62	13	2	38	60
Durables	22	60	18	27	62	11	3	49	48
Nondurables	15	49	36	23	60	17	2	28	71
Services	17	45	38	27	54	19	3	33	64
Transportation, communication, and public utilities	23	61	16	28	62	10	4	55	41
Trade	15	43	41	23	54	23	2	25	74
Finance, insurance, and real estate	22	45	33	40	48	12	4	42	54
Private households	2	9	89	5	26	70	2	7	92
Miscellaneous services	15	42	43	28	49	23	4	37	59
Public sector	24	56	20	34	56	10	12	56	32

Sector	Distribution in 1983								
	Total			Males			Females		
	High	Mid	Low	High	Mid	Low	High	Mid	Low
Total	21	46	33	30	47	23	7	44	49
Goods producing	24	46	30	30	48	22	6	42	52
Agriculture	3	27	69	4	28	68	1	21	78
Mining	48	42	9	53	40	8	28	55	16
Construction	28	45	27	30	45	25	6	51	42
Manufacturing	23	48	29	31	51	18	6	41	53
Durables	26	50	24	32	51	17	7	49	44
Nondurables	19	44	37	28	51	21	5	34	61
Services	19	42	40	30	43	27	6	40	54
Transportation, communication, and public utilities	36	49	15	43	45	12	14	56	27
Trade	14	38	48	21	44	35	3	28	69
Finance, insurance, and real estate	22	43	35	44	39	18	7	46	46
Private households	2	8	90	2	18	80	1	7	92
Miscellaneous services	16	43	41	28	41	31	7	44	49
Public sector	23	55	23	32	53	15	12	56	32

[1] Income categories established using median male weekly earnings of \$142 in 1969 and \$379 in 1983 as a middle benchmark. The categories are defined as follows: High (1983) = \$500; Mid (1983) = \$250–499; Low (1983) = \$0–249; High (1969) = \$187; Mid (1949) = \$94–187; Low (1969) = \$0–93.

Source: Bureau of Labor Statistics: unpublished data. Usual Weekly Earnings of Employed Full-Time Wage and Salary Workers. 1969–1983.

> Manufacturing may provide a larger share of middle-class jobs than the rest of the economy. But it scarcely represents the backbone of the middle-class. If all manufacturing workers were to be reemployed with earnings patterns typical of the rest of the economy, the aggregate distribution of earnings would change very little. The number of workers receiving upper-class and middle-class earnings would decline by only 3 percent and 1.7 percent, respectively.
>
> A similar analysis with a slightly different data base . . . [shows that] the proportion of middle- and upper-class jobs for both males and females is higher in high-tech than in the rest of manufacturing. All of the major high technology industries (chemicals, electrical and nonelectrical machinery, aircraft and instruments) have smaller shares of lower-class jobs than the rest of manufacturing and almost all of them have larger shares of upper-class jobs.

While Lawrence does not find a significant reduction in the number of upper-income and middle-income jobs, other analysts suggest an overall increase in inequality of earnings. Frank Levy of the University of Maryland's School of Public Affairs concludes:

> Since 1973 the family income distribution has changed in two, overlapping ways. First, inequality has increased: the percentage share of income going to the middle and bottom of the distribution has declined slightly. Second average incomes have declined slightly and so the whole distribution has stopped moving to higher income levels as it did during the previous 26 years . . . the combined effect of these two changes . . . shows that between 1973 and 1984: (1) the proportion of families with incomes over $50,000 increased from 14.9 percent to 15.6 percent; (2) the proportion of families with incomes below $20,000 increased from 32.1 percent to 36.4 percent; and (3) the proportion of families with incomes between $20,000 and $50,000 fell from 53.0 percent to 47.9 percent (where all incomes are in 1984 dollars). [In the past,] rapidly rising incomes and, to a lesser extent, mobility within the income distribution enabled large numbers of families to enjoy a middle-class living standard for at least part of their lives and served as a substitute for greater economic equality. But since the 1973–74 oil price increase, income growth has stagnated while mobility within the income distribution has diminished. To this point, we have been able to maintain "the middle-class dream" through demographic adjustments—more two-earner couples, postponed marriages, and low birthrates. These adjustments can take us only so far.

However, Lawrence hypothesizes that the increased inequality of income results from the large number of baby-boomers who entered the workforce between 1973–1982 at starting salaries rather than from more basic structural change.[36]

Productivity of Service Industries.—While manufacturing productivity has increased, productivity in the service sector—which accounts for 60 percent of what the United States produces—is down. This decrease is contrary to conventional wisdom, which assumes greater productivity, and fewer jobs, with increasing computerization. Indeed, according to some observers, just the opposite has occurred. Service industries have provided a growing number of jobs, in part because they are inefficient. Although computer technology has the *potential* for improving the productivity of service workers, as Paul A. Strassmann, Retired Vice President of the Xerox Corporation, notes:

> Computers will not make a badly managed business better. The expenses for computerization and the increased rigidity in computer-managed procedures are likely to accelerate the decline of incompetent management. . . . One should automate successes, not failures. Moreover, we deploy a larger proportion of our national assets [than do other nations] on manipulating and shuffling information that doesn't produce anything.[37]

Part of this inefficiency, according to Drucker, results from "the steady growth of the invisible cost of government":

> It is a real cost in money and, even more, in capable people, their time, and their efforts. The cost is invisible, however, since it does not show in governmental budgets but is hidden in the accounts of the physician whose nurse spends half her time filling out governmental forms and reports, in the budget of the university where sixteen high-level administrators work on "compliance" with governmental mandates and regulations or in the profit-and-loss statement of the small business nineteen of whose 275 employees, while being paid by the company, actually work as tax collectors for the government, deducting taxes and Social Security contributions from the pay of their fellow workers, collecting tax-identification numbers of suppliers and customers and reporting them to the government, or, as in Europe, collecting value-added-tax (VAT). . . . in every developed country government mandates misallocation of a steadily growing portion of our scarcest resources, able, diligent, trained people, to such essentially sterile pursuits.
>
> We need to learn to ask in respect to any proposed new governmental policy or measure: Does it further society's ability to innovate? Does it promote social and economic flexibility? Or does it impede and penalize innovation and entrepreneurship? To be sure, impact on society's ability to

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[36] Levy, Frank. "The Middle Class: Is It Really Vanishing?" *The Brookings Review*, Summer 1987, p. 17 and Lawrence, Robert Z. "Sectoral Shifts and The Size of the Middle Class", *The Brookings Review*, Fall 1984, pp. 3–11.

[37] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", pp. 71, 137.

> innovate cannot and should not be the determining, let alone the sole criterion. But it needs to be taken into consideration before a new policy or a new measure is enacted—and today it is not taken into account in any country (except perhaps in Japan) or by any policy maker.[38]

Strassmann feels we have been able to maintain an inefficient information sector because there is not yet a strong global market for information services: "If and when it comes, the present accumulation of unproductive practices in the U.S. will create a massive upheaval, exceeding in severity what we have so far experienced in the decline of industrial America".[39] OTA's analyses also suggest that the U.S. positive balance of trade in services may be difficult to maintain. Although OTA estimates that services account for about one-fourth of American exports—higher than the 17 percent indicated in official government statistics—John Alic, Senior Associate at OTA, cautions:

> While the United States runs a positive balance of trade in almost all services with almost all regions of the world, this may not continue. OTA's assessment points to competitive threats in services much like those we have seen over the past 15 years in manufacturing. It will become more difficult to export services, even in the absence of trade barriers.[40]

Strassmann recommends that: (1) Congress redirect some of its attention from the problems of manufacturing industries to problems of the service sector; and (2) the National Science Foundation sponsor studies of the factors affecting productivity gains and losses by the information workforce. In addition to considering the effects of technology on productivity, the studies would assess the impact of Congressional policies such as the Tax Reform Act of 1986.[41]

Lawrence added the following observations about the need to increase productivity in the service sector:

> . . . if you look since 1973, what is striking is that productivity growth in goods areas has not done all that badly. In fact, it now looks in the last few years that we have returned more or less to the historic rate of improvement in manufacturing that we had before 1973. But if we look in the services area, we find there has been literally zero productivity growth over the period.
>
> And that ironically, rather than our international competitiveness, is the biggest drain on our living standards

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[38] Drucker, Peter F. *Innovation and Entrepreneurship: Practice and Principles,* New York, Harper & Row, 1985, pp. 253-260.

[39] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", p. 157.

[40] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, October 22, 1987 (No. 66). "Technology and Economics in a Shrinking World", p. 21.

[41] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", pp. 75, 157.

> today. Unless we can find a way to improve our services productivity, 60 percent of what we are producing, that is going to be the dominant source of our living standard improvements.
>
> So, I do applaud the quite novel notion that we should not simply be looking at the goods area. And indeed, what is striking is how little R&D expenditures take place in services production. Almost all our R&D is taking place in manufacturing. Why aren't we spending on R&D and services? We know abysmally little about the slowdown in services productivity.
>
> And again I applaud the notion that the National Science Foundation ought to be appointing a commission to investigate and to mobilize the kind of knowledge that we may well put in the battle against cancer. It is just as important if you will, from the standpoint of our future that we learn what works and what doesn't in this huge proportion of our economy where our productivity growth has been so poor.[42]

However, there were some reservations about the possibility of conducting sound research in this area. Ginzberg cautions:

> The argument that services are not productive is bad theory and worse statistics. We don't know how to measure productivity in services . . . . I [also] am very worried . . . about bureaucracy and the lack of effective management. But I wouldn't blame that on technology . . . . I think a very big technology like computerization takes a very long time to permeate. The automobile is 102 years old, and it took us not one generation, but two generations to get people to learn how to drive easily and to get the right products and to get it all worked out. And it took a half a century to get the trucks to compete with the railroads, et cetera. So, I would argue that in thinking about fundamental technologies—and computerization is one—you need a very long time perspective.[43]

4. Technological Expertise and the Global Economy

Many of the solutions proposed to protect American technology from replication outside the United States are no longer consistent with reality. A number of factors have combined since World War II to increase the integration of the global economy: technological change, increasing communications, rising levels of literacy and productivity throughout the world, freer flow of capital for investment, and increased sovereignty of nations whose development programs are no longer controlled and constrained by a few industrial powers. Thus, efforts to keep American technology within national boundaries may be largely irrelevant to the reality of a global economy. They therefore do not work to deprive the intended recipients of the knowledge and goods they wish to recieve.

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[42] Ibid., p. 147.
[43] Ibid., p. 128.

Reich puts it this way:

> With the notable exceptions of restrictions on the transfer of "sensitive" technologies to the Soviets and their allies, on the sale of major weapons systems, and on the pursuit of classified research by Eastern-bloc nationals, techno-globalism has been the norm in America. From the techno-globalist's point of view, it is meaningless to speak of America's discoveries and technological breakthroughs relative to those of Japan, West Germany, or any other friendly nation, because there is no way to separate "our" technological advances from "theirs". Technological development is a joint product of multinational institutions—universities, research laboratories, corporations, even defense programs—that link talented people from all corners of the globe through computers, satellite communications, and jet airplanes.
>
> This organizing principle has taken deep root in America. Basic research is now a worldwide undertaking. The scientists and engineers who populate American universities and laboratories typically think of themselves as members of a global community of researchers, who work jointly on projects, meet periodically in international conferences, exchange papers, and publish their findings worldwide. Their graduate students come from every nation on earth (last year more foreign students than American students received Ph.D.'s in engineering from American universities; most of these graduates returned to their home countries). Even the funding of American university research is now global. A substantial portion is sponsored by foreign companies, especially Japanese.
>
> Foreign companies, meanwhile, are setting up research laboratories in the United States, and staffing them with American scientists and engineers. American companies are doing much the same abroad—especially in Japan. More than 180 Japanese scientists and technicians now populate DuPont's Yokohama laboratory, where they develop new materials technologies. IBM is investing heavily in Japanese research: at IBM's Tokyo Research Laboratory, tucked away behind the far side of the Imperial Palace in downtown Tokyo, a small army of Japanese engineers is busy perfecting image-processing technology. At IBM's Kanagawa lab, in Yamato City, Japan, 1,500 reseachers are developing hardware and software for the next generation of computers.
>
> In 1986 Japanese companies placed more than $250 million in U.S. venture-capital funds. Rather than high financial returns, the Japanese want licensing, marketing, and joint-venture agreements with the companies they back. American companies likewise are buying some of their most complex technologies from foreign firms. West Germany's Siemens and Canada's Northern Telecom have

> become key suppliers of electronic components used by American makers of telecommunications equipment. West German and Italian companies are supplying other American manufacturers with precision casting, forgings, and ball bearings.
>
> Even the Defense Department, which is responsible for funding about 40 percent of all the research and development undertaken in the United States, has for the most part adopted an ecumenical attitude toward the advancement of new technologies. In 1983 it got Tokyo's agreement to allow Japanese companies to sell or license technology to American corporations working under contract to the Pentagon (marking the first time that the Japanese government had allowed Japanese companies to work even indirectly on American defense contracts). Last year the Pentagon secured West Germany's and Japan's cooperation on Star Wars research. Our allies remain skeptical that Star Wars will ever work as advertised. But they were seduced into joining the effort by the prospect of picking up expertise in the technologies involved—technologies that, they believe, would be important to their future economic competitiveness.
>
> Techno-globalism, in sum, has come to be America's central, albeit tacit, organizing principle for developing new technologies. The notion of "American" technology has thus become a meaningless concept. Across a broad expanse of the globe (excluding little but the Soviet Union and its allies) national boundaries have in this respect become less and less relevant.[44]

Therefore, proposals to keep American technological knowledge within the boundaries of the United States, even if desirable, would face major obstacles:

> First, there is the logistical challenge of confining new knowledge within national borders. Modern technology typically doesn't leak out in boxcars or briefcases. Instead, blueprints and designs flow out over the airwaves by satellites from one computer to another.
>
> Second, American universities, corporations, and even the Defense Department are now international endeavors. Their technological advances come by way of global projects that draw upon talented people the world over. To graft techno-nationalism onto these techno-global systems leads to absurd results.

For example:

> How . . . might an American university go about the task of excluding foreigners from major research projects? The first problem would be how to define who was foreign. A good many American university professors and graduate students are of foreign origin and only later become Amer-

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[44] Reich, Robert B. "The Rise of Techno-Nationalism", *The Atlantic Monthly,* May 1987, pp. 63–69.

ican citizens. Some are permanent resident aliens; some, here on temporary visas, hope and expect to remain in the United States. Some are American citizens who plan to teach and live abroad for long periods of time after they finish their research, and who will thus carry off whatever they learn. What about an American citizen employed by a Japanese company? Should he be excluded as well? Beyond the problem of deciding who should be excluded, there is the issue of what such people should be barred from doing. Should foreigners be permitted to enter American research laboratories? May they talk with American researchers about what's being learned? May they assist the American researchers—as research assistants or as administrative, clerical, or maintenance workers?

The questions grow even more tangled when it comes to distinguishing between American and foreign companies. Only American firms will be allowed to participate in the Sematech project; American firms will get first crack at inventions coming from national laboratories; the Defense Department doesn't want foreigners owning American high-tech companies. But what's an "American" firm?

Suppose that most of the shareholders and directors of a company are foreign, but its headquarters is in the United States and most of its employees are American. (This describes Fairchild before Fujitsu sought to take it over.) Does this firm qualify? Or suppose that a large and growing minority of the firm's shareholders are foreign, and 40 percent of its employees live and work abroad. Does this firm qualify? (It's IBM.)

Or consider an American-owned and -managed firm that has factories and research laboratories around the globe. This firm continuously applies what it discovers in one country to new products and processes being developed in another, and regularly shifts its scientists and engineers around the world. Should it be given special access to American technology? And what about an American-based firm that shares its technology with a Japanese firm and markets the Japanese-made products in the United States? In both instances American firms are apt to be exploiting American technology but using it elsewhere. Do these firms pass muster?

Most American high-tech companies are well along in the process of losing their uniquely American identities. *Faced with Japanese competitors that have more money to spend on research and development, and better-trained employees, even the largest and most well-endowed American firms have concluded that joining them is a wiser strategy than trying to beat them.* . . . the American firms will be sharing their latest technology with their Japanese partners, and vice versa. If the underlying purpose of techno-nationalism is to keep American technology here, then presumably Motorola, AT&T, and all the other American electronics firms now sharing technology with their Japanese counterparts should be excluded—lest the Japanese

> gain instant access to our technology. But by this criterion few "American" firms—if any—would remain eligible."
>
> *These paradoxes suggest a practical truth: techno-nationalism cannot be superimposed upon institutions organized on the basis of techno-globalism.* Even if it were clearly in the national interest to try to keep America's technological learning at home, this goal is too sharply at odds with the premises on which our universities and corporations are based for it to provide a meaningful guide for public policy.[45]

American Technological Expertise.—Losses in U.S. industrial competitiveness are unlikely to be recouped by attempts to keep technology within Americn borders. The point instead is to increase the technological experience of U.S. engineers and production workers so that Americans stay on the leading edge of technology and gain experience in turning basic research discoveries into commercial products regardless of who "owns" the company.

Reich notes:

> All over America there is growing worry that the Japanese are running off with our technology. This new concern is, I believe, misplaced. Americans are correct to worry about national technological prowess, but not about Japanese access to our technology. The emerging debate over how to restore America's technological preeminence misconstrues the problem and thus advances the wrong solutions. The underlying predicament is not that the Japanese are exploiting our discoveries but that we can't turn basic inventions into new products nearly as fast or as well as they can. Rather than guard our technological breakthroughs, we should learn how better to make use of breakthroughs wherever they occur around the globe. In this the Japanese may have much to teach us.
>
> . . . The value of technological learning is a certain kind of knowledge founded in shared experience. It exists in people's heads. Thus the real worry is not that we are becoming dependent on Japan's high-tech gadgets but that we are losing the ability to transform new discoveries into gadgets nearly as efficiently as they can.
>
> Most advances in technology build on what has come before—on prior technological experience. . . . Experience—the breadth and depth of familiarity with technology is what determines the technological fecundity of a society. *Mere information, such as specific data about the latest discovery or blueprints of a new invention, is relatively useless for designing future generations of technology. It may solve an immediate technological problem, but it does not provide experience for solving the next one. It supplies answers but it does not teach. Indeed, access to information may actually inhibit learning. As anyone knows who has tried to solve a puzzle with the answer book open, or tried to learn directions from here to there as a passenger rather*

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[45] Ibid.

> *than a driver, the ready availability of help can substitute for direct experience and thus make it more difficult to do it yourself the next time.*
>
> . . . What's crucial is the extent of American engineers' and production workers' technological experience—their cumulative insights into how technologies work and how they can be adapted and improved—for only prior experience enables one to absorb the new technological learning and translate it into new experience.
>
> The warnings now issuing from Washington that Japan might hold back certain high-tech gadgets mistakenly assumes that high-tech gadgets are like strategic raw materials—the kind of thing that one shouldn't have to depend on a foreign power to supply. But the analogy is inapt. These days our security depends less on ready access to blueprints or materials than on our collective ability to apply knowledge quickly to solving new problems. What needs to be stockpiled is not gadgets or things but experience and competence. As long as our engineers and production workers have accumulated experience in the technologies on which the Japanese gadgets are based, they can easily contrive replacements. Indeed, because high technologies evolve so quickly, both our military security and our commercial competitiveness turn on how quickly we can transform emerging technologies into the next generation of gadgets.[46]

A recent study by OTA of the impact of overseas technology transfers reached similar conclusions:

> Some U.S. based firms do seek out and license technologies abroad, but a broad shift in attitude toward foreign know-how on the part of American corporations seems called for. On the government side, it may be more important to pursue policies aimed at drawing in foreign technologies than to pursue policies aimed at slowing the flow of U.S. know-how overseas.[47]

Contribution of Foreign Nationals.—The proportion of foreign nationals in American universities and in the science and engineering workforce has grown substantially in recent years. Jean-Jacques Servan-Schreiber and Herbert Simon of Carnegie Mellon University report:

> As of 1986, more than 300,000 foreign students were enrolled in American universities, 60 percent of them in technical fields. . . . The statistics show that from 1963 to 1983, the percentage of foreign-born doctoral students in industrial engineering grew from 7 percent to 68 percent; in mechanical engineering from 28 percent to 60 percent; in electrical engineering from 23 percent to 55 percent; in

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[46] Reich, Robert B. "The Rise of Techno-Nationalism", *The Atlantic Monthly,* May 1987, pp.63–69.

[47] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, October 22, 1987 (No. 66). "Technology and Economics in a Shrinking World", pp. 29–30.

> chemical engineering from 22 percent to 52 percent; in civil engineering from 37 percent to 63 percent. . . . As of last year, foreign students made up 40 percent of Ph.D. candidates in such fields as: cognitive science . . . medical information science . . . software engineering . . . and non-linear mathematics.[48]

In 1982, the proportion of foreign nationals in the American science and engineering workforce was 17 percent, up from 10 percent in 1972. And the proportion of foreign nationals in teaching, basic research and other scientific positions is expected to continue to increase.[49]

Servan-Schreiber and Simon note:

> For the first time in modern history, one country seems to serve, in the advanced sciences, as the university of the world. "The United States is viewed, worldwide, as the place to come and study in the sciences", says John Reichard, Vice President of the National Association for Foreign Students.[50]

But the "intellectual migration" has sparked debate:

> Is it good for America to be educating the world's best and brightest? Is it good for other countries to lose some of their best brains every year? What kind of policy is it that subsidizes America's corporate rivals with millions of dollars worth of vital research?
>
> There's little doubt that American taxpayers are subsidizing the foreign student boom. The tuition paid by foreign students [as well as by American students] is "less than half" of the yearly cost of training a graduate engineering student, according to the University of Michigan at Ann Arbor.[51]

The principal problem may be quite different:

> We don't have too many foreign students, we have too few Americans. We are not attracting enough of our students into graduate schools," declared the director of the American Society for Engineering Education, Karl Willenbrock. Moreover, according to the NSF, 57 percent of the 5,000 foreign students granted doctoral degrees in the sciences from American universities last year said they intended to remain in this country.
>
> "We have done very well with the people we got from other countries. They include Albert Einstein and Enrico Fermi", concludes Peter Denz, Administrator of the Conference Board.[52]

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[48] Servan-Schreiber, Jean-Jacques and Simon, Herbert. "America Must Remain the World's University", *The Washington Post*, November 15, 1987, pp. C1–C2.

[49] Solomon, Steven. "American Laboratories, Foreign Brains", *The New York Times*, July 19, 1987, p. F8.

[50] Servan-Schreiber, Jean-Jacques and Simon, Herbert, "America Must Remain the World's University", *The Washington Post*, November 15, 1987, pp. C1–C2.

[51] Ibid.

[52] Ibid.

Sevran-Schreiber and Simon cite substantial benefits from continuing to encourage foreign students to attend American universities:

> Foreign students give the United States as much as they get. They are paying for their long years of study with the most precious and expensive commodity, the one the United States most needs today: more knowledge, new knowledge, provided by their labor. By working in American laboratories for three to seven years of postgraduate study, thousands of young experts are by themselves the most efficient "subsidy" to scientific progress and economic development. And a large majority of them do not choose, at graduation, the well-paid jobs offered by industry but remain in the tough, competitive life of research and teaching.
>
> Foreign students are needed to meet American research and development goals. If most of the foreign students were to return to their countries, it would be an American disaster. The fact that more than half of them choose to stay (a number that would increase if U.S. immigration rules were less restrictive), multiplies the productivity and creativity of American science and engineering.
>
> The fact that a substantial number choose to return home is also very good. The great American knowledge-machine could not function for very long if it kept siphoning away the brain-power of America's partners around the world. The loss foreign countries experience when students come here is more than repaid by the new knowledge and skills they acquire when nearly half of them return.
>
> We believe that a 50–50 trade is a fair ratio. It has become important to America that a substantial fraction of the trained foreign students remain at work here as long as there is a large deficit of U.S. applicants to the long, strenuous, underpaid, doctoral programs. The next 10 to 15 years are crucial. During that period, the number of competing international laboratories, corporations and learning-systems will continue to increase. These years, between now and the end of the century, will decide whether America remains in the first rank, or falls behind. The critical difference might well be made by the capacity to retain half of the best and brightest foreign students.
>
> . . . If foreign students would ever stop pressing for admission to U.S. universities, it would be a sign that America has lost its last great resource.[53]

Reciprocal Access.—In contrast to the 300,000 foreign students in American universities, only 30,000 American students attend universities abroad. Approximately 3 percent of these students study in technical areas such as engineering, computer science and physics.[54]

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[53] Ibid.

[54] Ibid.

Some observers conclude this imbalance is simply the result of barriers in other countries. Japan typically is the case in point. But current discussions of reciprocal or "symmetrical" access of American students and scientists to foreign research institutions may oversimplify the problem. Charles Owens, former director of NSF's Tokyo office, cautions:

> Access by U.S. researchers to Japanese laboratories depends at least as much on actions by Americans as it does on actions by Japanese. Given the size of our respective scientific establishments, it is unlikely that Japan could absorb as many of our researchers as we could of theirs. There are probably relatively more opportunities for Japanese to significantly advance their research in the U.S. than for Americans to significantly advance theirs in Japan.[55]

One problem is the different R&D systems in the two countries. Japan conducts most of its basic research in private industry and government agencies, while U.S. basic research is carried out in open universities. Moreover, until recently, Japan has not emphasized basic research in many fields but instead has put more emphasis on applied research and engineering activities—both more likely to be proprietary.[56]

In this context, *The Wall Street Journal* reports:

> The Japanese seem to feel acutely vulnerable about their basic science. They have indulged much self-criticism, which only intensified when the Nobel Prize in medicine recently went to a Japanesee who had moved to the U.S. 24 years ago. Touring Japan recently, the scientist, Susumu Tonegawa, appealed for change. "Japan has developed its technology on foreign scientific achievements" in this century, he said. "Now that Japan is a large economic power, we cannot keep using the basic scientific achievements of others." Many observers trace the weakness in scientific creativity to elements of Japanese society, such as the stress on group harmony over individual excellence. "Academic scientists seem sealed within their departments, content to do a competent job there rather than excel worldwide," says Hajime Nishimura, the head of Tokyo University's department of chemical engineering. Some Japanese also say that their country has been fully occupied absorbing foreign science; now that it is technologically caught up, they add, it is ready to innovate.[57]

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[55] Owens, Charles T. "Access to Japanese Laboratories", Comments at the International Conference on Japanese Information in Science, Technology and Commerce, University of Warwick, September 1-4, 1987, pp. 1-7.

[56] Hearing before the Subcommittee on International Scientific Cooperation, Committee on Science, Space, and Technology, 100th Congress, First Session, February 10, 1987 (No. 89). "Monitoring Technology Flow: Science, Technology and Trade Policy Implications", pp. 8-19 and Rasky, Susan F. "Groping for a New Order on Trade", *The New York Times*, August 30, 1987, p. C1.

[57] Yoder, Stephen Kreider. "Native Son's Nobel Award Is Japan's Loss", *The Wall Street Journal*, October 14, 1987, p. 30.

Another problem is that Americans are not well informed about research opportunities in Japan. Owens puts it this way:

> First, the Japanese have invested the resources to learn our language and to inform themselves on our system, while we have not made the same investment to easily operate in theirs. Second, our scientists and engineers depend on their status and advancement on making their work widely known through scholarly publications, while Japanese must impress only their seniors in their field at home to make their reputation and their career. Further, it is the Japanese way not to flaunt one's achievements. There may be a significant body of Japanese basic research of which we are unaware because they don't feel an urgency to publish and because we don't ask.[58]

However, there have been recent changes. Japan has added two goals to its science policy: to encourage basic research and to increase foreign participation in the Japanese R&D system.[59] John H. Moore, Deputy Director of the National Science Foundation, notes that in the past 10 years, Japan has had the world's highest rate of increase in the publication of scientific articles.[60] And Mitchel B. Wallerstein of the National Research Council describes Japan's interest in reducing current imbalances in the exchange of scientists and engineers:

> Japanese Government officials recognize that additional steps must be taken to reduce the current imbalances between the number of Japanese scientists and engineers working abroad and the number of foreigners working in Japan, although the Japanese frequently point out that their citizens working abroad are making a major contribution to the R&D systems of the host countries (e.g., the recent Nobel Prize for medicine awarded to a Japanese researcher at MIT).[61]

There are indications that Japanese laboratories would be quite willing to accept American researchers. But as Owens notes: "To date, we have done very little to test the degree to which appearance and reality coincide.[62]

5. REGIONAL JOB CREATION IN HIGH TECHNOLOGY INDUSTRY

The success of regional development programs such as Silicon Valley and Route 128 is attributed to a number of factors:

- government support for programs ranging from research parks at universities to job training programs at community colleges;

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[58] Owens, Charles T. "Access to Japanese Laboratories", Comments at the International Conference on Japanese Information in Science, Technology and Commerce, University of Warwick, September 1–4, 1987, pp. 1–7.

[59] Hearing before the Subcommittee on International Scientific Cooperation, Committee on Science, Space, and Technology, 100th Congress, First Session, February 20, 1987 (No. 89). "Monitoring Technology Flow: Science, Technology and Trade Policy Implications", pp. 8–19.

[60] Ibid., pp. 75–92.

[61] Ibid., pp. 8–19.

[62] Owens, Charles T. "Access to Japanese Laboratories", Comments at the International Conference on Japanese Information in Science, Technology and Commerce, University of Warwick, September 1–4, 1987, pp. 1–7.

- government programs to encourage government, university, industry linkages;
- tax and other incentives to attract industry;
- increases in national defense spending;
- existing technological infrastructure in the region—the quality of universities, strong scientific and technological labor force, research and product development at universities, industry, and federal laboratories;
- existing entrepreneurial network of "complementary and competitive enterprises," distributors and customers;
- availability of venture capital; and
- increases in foreign investment including direct ownership of companies which produce within the United States.

It is difficult to measure the relative contribution of these factors or to determine their impact on job creation. Although federal and regional policies clearly have played a significant role, regional economic development also depends on a fortuitous combination of circumstances which may be difficult to replicate.[63]

Anderson puts it this way:

> In Palo Alto, I've tried to reconstruct a little of the history of Silicon Valley, and, as far as I can find out, a professor of engineering at Stanford suggested to some of his graduate students that they set up business locally and use the university facilities if they needed to at night and weekends, and these were Hewlett, Packard, and the Varian brothers, and I'm sure there was nothing in writing about what they did. It was interest in furthering interesting ideas.
>
> When Shockley first moved to Silicon Valley, I looked at his lab and the set-up there. There was no Government support of that. It was some people doing what they felt like it. At MIT, when I questioned some of the older people about how Route 128 was set up, they said—I doubt that this is true now—that it used to be that a professor who didn't make more money consulting outside than inside wasn't wanted. If the industry did not want him, then they didn't either. So there was a natural tendency for the staff to find out what was going on in industry, because that's what they taught, and they saw new possibilities and formed companies by the dozens.
>
> We have not been able to reconstruct those conditions. In the research triangle, attempts have been made to reconstruct the conditions under which a blossoming of new technology and new ventures occurred, without tremendous success, and one would suspect, for example, that around the national labortories there would be rings of small companies, and there aren't.[64]

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[63] Jaschik, Scott. "States Trying to Assess the Effectiveness of Highly Touted Economic Programs", *The Chronical of Higher Education*, June 3, 1987, pp. 19, 26 and U.S. Congress, Office of Technology Assessment. *Technology, Innovation, and Regional Economic Development*, July 1984, pp. 3–13.

[64] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 29, 1987 (No. 28). "The Commercial Development of Medical Biotechnology", p. 111.

It also is difficult to attribute the creation of jobs to a single factor or to measure the "opportunity costs" of programs either within a region or for the national economy.[65] Reich notes:

> A program of community assistance intended to upgrade local infrastructure and attract new industry may be used simply to prop up ailing businesses or to bid firms away from other communities that are in equally dire straits. . . . firms seeking to diversify or develop new products in an effort to regain competitiveness seldom, if ever, base their location decisions on financial lines offered them by needy communities—lures such as tax abatements, low interest financing, or transporation facilities, most of which are made possible by federal grants. For one thing, the real value of these offerings comprises, at most, a very small fraction of the costs of starting and operating a new enterprise in the area, particular when compared to factors such as prevailing wage rates, the availability of particular skills, access to raw materials and suppliers, and local energy costs. Perhaps more significantly, so many jurisdictions now offer these inducements that they largely offset one another.[66]

Moreover, some economic development programs—e.g. improving university graduate and research programs—cannot be expected to have a short-term, direct impact on job creation.[67]

Federal Role.—The Federal Government has contributed to regional development primarily as an indirect result of policies and programs designed for other purposes—macro-economic policy, research and development programs, technology transfer, national defense programs, and education and training.

Both the Office of Technology Assessment (OTA) and the National Governor's Association (NGA), while not recommending a new federal effort specifically targeted on high technology regional development, suggest that federal programs designed for other purposes specifically consider the effects on economic development nationwide.[68] In this context, OTA cautions:

> . . . to define Federal policy for regional development based on distinctions between "high technology" and "low technology" would be artificial and possibly misleading. By any definition used today, high-technology industries are expected to grow somewhat faster than will overall employment over the next decade. Because of their relativity small employment base [depending on the definition of

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[65] Jaschik, Scott. "States Trying to Assess the Effectiveness of Highly Touted Economic Programs", *The Chronicle of Higher Education*, June 3, 1987, pp. 19, 26 and U.S. Congress, Office of Technology Assessment. *Technology, Innovation, and Regional Economic Development*, July 1984, pp. 3–13.

[66] Reich, Robert B. "Making Industrial Policy", *Foreign Affairs*, Spring 1982, pp. 852–881.

[67] Jaschik, Scott. "States Trying to Assess the Effectiveness of Highly Touted Economic Programs", *The Chronicle of Higher Education*, June 3, 1987, pp. 19, 26 and U.S. Congress, Office of Technology Assessment. *Technology, Innovation, and Regional Economic Development*, July 1984, pp. 3–13.

[68] U.S. Congress, Office of Technology Assessment. *Technology, Innovation, and Regional Economic Development*, July 1984, pp. 3–13 and National Governor's Association. *Making America Work: Productive People, Productive Policies*, Washington, D.C., 1987, pp. 72–78.

> high technology used, between 3 and 13 percent of total U.S. employment] however, these industries will directly account for only a small fraction of total employment growth. It is likely that their largest employment impacts will come through the diffusion and widespread application of their products by other industries, "smokestack" and services alike.[69]

OTA concludes that federal macro-economic policies appear to have "the largest and least intentional influence" on regional high technology economic development.[70] In recent recommendations for federal policy with respect to "jobs, growth and competitiveness," the NGA also placed greatest emphasis on macro-economic policy:

> The Federal Government needs to provide a balanced and stable economic framework, both domestic and international. As the world economy becomes more integrated, this will not only become more difficult, it will become more important.[71]

The NGA also recommended strategies to "provide more effective regional targeting and flexibility in state programs". These are areas where the Federal Government could participate in mitigating unemployment hardships.

> *Minimize Economic Disparities across States and Regions.*—Regional economic disparities raise problems not only for the people, communities, and regions directly affected but for the entire nation. In recent years, nearly every section of the country has been affected by severe economic distress. Less than ten years ago, it was basic manufacturing in the Northeast and Midwest. Today it is agriculture, mining, and oil in the West, Midwest, and South. A number of our current federal programs could be more effectively targeted to those areas that can benefit most, particularly rural areas and inner cities.
>
> We also need to take a fresh look at how rural America is faring in the new international economy and how federal and state programs affect rural communities. . . . The development of a national rural development strategy should become a high priority for the Federal Government . . .
>
> *Create a Flexible and Responsive Employment System.*—The states and the Federal Government should explore the advantages and disadvantages of altering the unemployment insurance program to use a portion of the funds to finance retraining, relocation costs, and enterpreneurial initiatives. European countries have provided lump sum payments for individuals to start their own businesses and for some this has been successful. The experiences of the

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[69] U.S. Congress, Office of Technology Assessment. *Technology, Innovation, and Regional Economic Development,* July 1984, pp. 3–13.

[70] Ibid.

[71] National Governor's Association. *Making America Work: Productive People, Productive Policies,* Washington, D.C., 1987, pp. 72–78.

thirteen states that have been experimenting with varying schemes to allow employees to reduce hours worked and receive partial U.I. payments provide valuable lessons for making the program less rigid. Consideration should be given to shared financing of the program by employers and employees as is the case in New Jersey and most European countries. Additionally, the advantages of vesting some portion of the employee account for the individual, as is done with pension accounts, should be explored.

Given the new realities of the global economy, state, and federal policymakers may want to undertake a coordinated analysis and study of the portability of health and pension plans. We may also need a study of the value and feasibility of revising unemployment insurance benefits to include payments into employee health insurance and retirement plans to maintain coverage on a current basis while the individual is between jobs.

Given the great diversity in employee benefit packages and the varying circumstances in which employees find themselves, it may make sense to allow employees to design their own benefit packages and to determine how employer contributions will be allocated among protections being purchased. Some may emplasize health protection, others pension. More study is needed in this area.

Redefine the Federal/State Partnership.—A number of federal and state programs could be refocused to enhance their overall contribution to competitiveness. Several examples are:

Export Development.—The Federal Government can provide information about foreign markets, export trade opportunities, and patterns of international trade much more efficiently than the separate states. Therefore, the Federal Government should expand its efforts in "trade intelligence" and should transfer to the states the responsibilities for providing technical assistance to exporters."

Small Businesses.—The Federal Government and the states both provide direct financial and technical assistance to small businesses. There are many creative initiatives at the state and local level. Federal resources could be reallocated to support these initiatives, transferring some program monies to the states to be spent consistent with state economic development strategies. The joint federal/state small business development cooporations provide one example.

Technology.—The Federal Government should continue to have a lead responsibility for financing research and development. These benefits cross state lines and have a national focus. There is also a need for closer coordination of federal efforts with state initiatives to build a strong research infrastructure and to accelerate the commercialization of research. Recent federal initiatives, such as the Federal Technology Transfer Act of 1986, encourage coop-

> eration between federal, industry, and state activities. But cooperation could be further enhanced. . . .[72]

6. TRANSITIONAL PROGRAMS FOR WORKERS

Witnesses before the Task Force agreed that high priority should be given to developing public policies for addressing worker and community dislocations. Indeed, differences which did occur often reflected a difference in emphasis rather than basic policy. But witnesses held different views about some key points—for example, the feasibility of earmarking worker adjustment funds for specific categories of workers. The proposals summarized below illustrate some of the recent recommendations for addressing worker dislocations. Many of the proposals are intended to provide alternatives to special protection by easing the transition through difficult periods.

Declining Tariffs to Finance Worker Readjustment Programs.—Lawrence suggests that revenues raised from declining tariffs and from auctioning off existing quotas should be earmarked for assisting workers adversely affected by imports:

> Even under highly conservative assumptions our proposed program . . . could be readily financed for at least a decade by converting existing quotas into declining tariffs. . . . trade adjustment assistance (TAA) for firms, workers, and communities has been rendered increasingly ineffective because its funding has been severely cut back over the past five years.[73]

There is some disagreement about the advisability of targeting worker readjustment programs on specific categories of workers—for example, those displaced by trade imbalances or by technological change. For Lawrence, the major advantage of earmarking funds is to provide a "safety valve" against protectionist pressures as well as to raise revenues for programs which have become increasingly ineffective because of inadequate funding.[74]

Some analysts note practical difficulties in attributing worker dislocations to specific causes, like imports, technology, or poor management.

In Ginzberg's view:

> . . . the Federal Government should move with considerable caution to introduce specially targeted programs to ease the problems of dislocated workers. The reason for this recommended caution is that it is often hard or impossible to determine whether plant shutdowns and ensuing unemployment reflect trade imbalances or other causes (poor management) or some combination of both. Further, I believe that our efforts to date with special adjustments such as TAA were not satisfactory and were costly.[75]

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[72] Ibid.

[73] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force", pp. 56–59.

[74] Ibid.

[75] Ibid.

Mowery reaches the same conclusion:

> The [NAS] felt that targeting workers according to the cause of their displacement would induce severe administrative problems and result in severe delays in the delivery of services, simply because it's so difficult to determine the precise cause of displacement of an experienced worker. Consider the relative role of technological change in the U.S. economy and technological change in foreign economies in displacing workers in trade-impacted industries, for example.
>
> Should technological change in Japan be counted as a source of displacement for workers in the U.S. auto industry who are displaced by imports? Is it imports or is it technological change? Should we spend 14 months trying to decide which of these it is? If we do, the panel felt, we'll end up not getting the services to the workers when they need it.[76]

Hufbauer and Rosen argue that self-financing options (i.e., the use of revenues from declining tariffs and auctioning off existing quotes) are essential to the effectiveness of adjustment programs since *general* revenues provide only a small proportion of the funds needed to serve displaced workers:

> This argument for equivalent assistance as between trade-impacted firms and workers, and other displaced firms and workers, ignores political reality. The Job Training Partnership Act (JTPA), for example, provides less than $3,000 of federal benefits per displaced worker, and no benefits to industry. The benefits of special protection can easily exceed $5,000 for every worker in the industry, not just displaced workers. The total annual transfer of resources from consumers to producers in just one instance of special protection, the automobile case, exceeded $2.6 billion annually. This figure dwarfs the magnitude of JTPA.
>
> In practical budget terms it would not be possible to enlarge JTPA and other wide-angle programs to match the level of targeted benefits now provided by special protection. In January 1983, the total number of dislocated workers, defined as unemployed persons in a declining industry or a declining area, reached some 1.7 million persons. If benefits in the range of $10,000 per employee were extended to these dislocated workers and their firms, the budget cost would be huge, about $17 billion annually [although there would be some offset for a reduction in unemployment benefits of a maximum of $4 billion].[77]

To address the practical difficulties in attributing worker dislocations to specific causes, Hufbauer and Rosen propose that all workers present in the declining industry on a specific date should receive assistance regardless of the assumed cause:

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[76] Ibid., p. 81.

[77] Hufbauer, Gary Clyde and Rosen, Howard F. *Trade Policy for Troubled Industries*, Institute for International Economics, Washington, D.C., March 1986, pp. 1-43, 67-94.

> . . . benefits might be *funded* from "domestic" sources to the extent of falling domestic demand or rising productivity, and from "international" sources to the extent of rising imports. This division of the funding burden could be carried out by an appropriate blend of general revenues, product taxes, and tariffs (or auctioned quotas). A division of the funding burden would, however, add contentious complexity to the adjustment scheme; and our calculations . . . suggest that tariffs (or auctioned quotas) alone would provide more than enough revenue to handle the adjustment needs of *all* departing workers and firms, whatever the cause of their exit from the industry. For these reasons, we think that the division of the funding burden between "domestic" and "international" sources should be an optional, not a mandatory, feature of the new program.[78]

Re-employment Programs.—Witnesses advised that incentives to industry and workers should expedite the reemployment of displaced workers, noting that some programs have delayed adjustment by giving extended unemployment compensation payments without positively encouraging workers to find alternative employment. Lawrence notes:

> . . . even in its heyday, TAA delayed adjustment, particularly by displaced workers who were merely given extended unemployment compensation payments without being positively encouraged to find alternative employment.
>
> . . . there is indeed something very traumatic and difficult for a worker who was earning a high wage to now have to experience a precipitous decline in his or her income. Indeed, there is an incentive to delay adjustment because of that erosion in the income that that worker would experience.
>
> My suggestion is a form of . . . wage insurance for workers from such displaced and dislocated industries. If a worker were earning say $25,000 or $30,000 a year and they found a new job paying $10,000 I would suggest that they would be compensated say for half of the erosion in their wages for some period of time. That proportion could be adjusted according to their age [and seniority] with older workers getting more.

Workers residing in regions where the unemployment rate was significantly higher than the national average would be eligible for extended unemployment compensation; workers who wished to find employment in other areas would receive relocation allowances.[79]

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[78] Ibid.

[79] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Changes on the Labor Force", pp. 25–26, 57, 59.

Financing Training and Education.—Witnesses made several proposals for financing programs for those workers who chose education and retraining. The proposals circumvented traditional funding methods in an attempt to increase resources. Lawrence suggested a federal loan program which would make it possible for anyone who wanted to undertake higher education or retraining in a recognized institution to receive full resources from the government and then be liable to pay it back through income taxes contingent on future income:

> . . . my own view is that imperfection in the market for training really is an area where the government has a role to play. . . . whereas a bank can't obtain your future earnings, the government can because everybody files tax returns. . . .
>
> . . . And I'm not talking about only giving them partial resources. . . . After all, if training is going to add to their incomes, and the government can take a share of that, I think you should be able to operate this and not necessarily with large amounts of concessional financing.[80]

Two additional proposals for education and training loans were cited at hearings of the Technology Policy Task Force:

Mowery noted the recommendation of the Panel on Technology and Employment to institute a program of federally-provided direct loans or loan guarantees, administered by state or local authorities to displaced workers who could use the loans to finance retraining or relocation or to establish new businesses.[81]

Strassmann proposed tax deductions for education and training expenses:

> If an employee's *knowledge* is his capital, and the basis for a major share of his earnings, then all education and training should be given the same preferential treatment as we have given traditionally to *capital*. In the industrial age societal productivity was largely determined by the easy availability of *capital*. The encouragement and protection of capital formation, whether in the form of assets or technology, has always been one of the prime objective of government policies."
>
> In the information age, the *knowledge* capacity of the workforce is the basis of societal productivity gains. Capital is plentiful and becomes an easily available commodity, on a global scale. Hence, legislative policy should shift from concerns about capital to preferential treatment of every conceivable means for enhancing the *knowledge capacity* of the U.S. workforce.
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> Specifically, Congress should adopt the policy that all educational and training expenses should become fully tax deductible and, in special cases, eligible for a depletion allowance. This shift should be financed by a gradual removal of the preferential tax treatment given to the role of

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[80] Ibid., pp. 133–134.
[81] Ibid., p. 88.

> physical assets. In this regard, the recent elimination of the investment tax credit was a move in the right direction. However, the gains in tax revenues should have been reinvested into the creation of new *knowledge capital.*[82]

Strengthening Title III of the Federal Job Training Partnership Act (JTPA).—Mowery recommended improvements in services for displaced workers by: (1) increasing JTPA's coverage of displaced workers from the current level of 6-7 percent; (2) broadening the range both of employment and training services; (3) broadening income support for displaced workers engaged in training; and (4) revising state unemployment compensation laws to guarantee that displaced workers who are eligible for unemployment compensation can receive benefits during training.

The panel estimated costs of these proposals based on U.S. Bureau of Labor Statistics figures on the annual flow of displaced workers from 1979 to 1983. If displaced workers are defined as workers with at least three years experience in the job from which they were laid off, the annual flow was approximately 1 million persons; the estimated annual cost is $785 million to cover 30 percent of the workers—a participation rate considerably higher than in any program to date. If workers in shorter term jobs are included, the estimate increases to 2.3 million persons, with an annual cost of approximately $1.8 billion to serve 30 percent of the displaced workers.[83]

Lawrence noted that the proportion of existing labor force participants to new entrants will increase over the next decade both as a result of the baby bust generation and the fact that the proportion of women entering the labor force is likely to level out:

> . . . what we know about our society is that increasingly it is going to be the existing workers who have to be retrained. . . . Our policies have to change as a result of that.[84]

Ginzberg stressed the importance of strong employment counseling and placement services for displaced workers:

> It is desirable to have reasonable amounts of retraining money in the JTPA program available for workers who need and want and can profit from retraining. But the sad fact is that many workers with minimal educational competencies cannot be effectively retrained. They can best profit from a stronger federal-state employment system with improved counseling and placement assistance. I have long favored a federally financed jobs program at minimum wages—with remedial educational opportunities—for those who need a job. Admittedly the latter would require new funding and I see no alternative but to raise taxes to cover the cost.[85]

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[82] Ibid., p. 156.
[83] Ibid., pp. 88–89.
[84] Ibid., p. 146.
[85] Ibid., p. 153.

Evaluation of federal employment and training programs remains a problem. Mowery noted that we do not yet have rigorous evaluation data to assess the effectiveness of these programs. Although there is some evidence—in part anecdotal—that the programs improve employment prospects, there is little knowledge to provide guidelines for program design.[86]

Clearly there are many individual success stories. As Williams noted:

> There are a great many examples of successful training efforts. There are a great many examples in terms of various industries. There are some unions that have been much involved in training. There are some projects in terms of retraining like those in the automobile industry that have been negotiated with the UAW and Ford . . . and General Motors.
>
> There are many success stories in the JTPA in terms of individuals. We have tried deliberately in the steelworkers because we have been negotiating with essentially companies that haven't got any money to spend really, and they're in great, difficult circumstances. So, we made a deliberate effort to try to make as much use of government finance out there as we could. . . . The whole problem has been that the resources available for this have been so limited in relation to the need. . . . Certainly I think one of the reasons that our modest efforts have been successful is that the union, the workers, and the company and the JTPA effort— there has been joint involvement in doing these things.[87]

Early Retirement Options.—Some witnesses stressed the importance of an early retirement option. They argued that most of America's industrialized partners provide these options as a matter of social equity as well as to facilitate structural changes. Ginzberg suggested an amendment to Social Security allowing workers who are unemployed due to plant shutdowns, to receive reduced benefits if they are between 58 and 62 and have 20 or more years employment. He argued that using the Social Security system would "avoid putting the costs of large underfunded pension plans on the federal system or the U.S. Treasury."

Ginzberg noted that it is common practice for European countries to offer early retirement at age 55 or 58: "It looks to me like a minimum kind of a thing that a civilized society might be willing to do."[88]

Williams also stressed the importance of an early retirement option:

> Of particular concern to potentially displaced workers in restructuring industries is the availability of early pensions due to plant shutdowns. Almost all of our industrialized partners provide these older-worker compensation measures not only to facilitate structural changes. There is

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[86] Ibid., p. 89.
[87] Ibid., p. 135.
[88] Ibid., p. 129.

> also a question of social equity. Yet, we are faced with an anomaly. Steel firms have declared themselves hampered by these "exit costs" and have been engaging in Chapter II bankruptcies in order to avoid these obligations. Furthermore, even when pension plans have been terminated and the PBGC assumes responsibility for guaranteeing the basic benefits, this agency insists upon intervening in collective bargaining agreements if the unions attempt to recover for the structurally displaced workers those shutdown benefits not guaranteed by the PBGC. My point, Mr. Chairman, is that workers are unable to be sympathetic with the goals of industrial transition since there are little transitional programs assisting them.[89]

Advance Notice of Plant Shutdowns or Large Scale Layoffs.—Several witnesses advocated mandatory advance notice. Mowery recommended federal legislation requiring that as many workers as possible receive at least two to three months advance notice of plant shutdowns or large-scale layoffs. The recommendation is based on the following rationale:

> Worker adjustment assistance programs are more effective when services are provided to workers prior to their displacement. Such pre-layoff assistance generally is feasible only in the context of advance notice. In addition to improving the effectiveness of public investments in worker adjustment assistance programs, advance notice reduces the duration of unemployment compensation. A number of groups, including the National Association of Manufacturers, the Business Roundtable, the Secretary of Labor's Task Force on Economic Adjustment and Worker Dislocation, and the President's Commission on Industrial Competitiveness, have endorsed voluntary advance notice.
>
> Although there is disagreement over the mechanisms that will provide the broadest possible coverage of the U.S. workforce, voluntary advance notice does not appear to provide substantial advance to more than a small share of the workforce. According to the U.S. General Accounting Office, nearly 30% of the workers surveyed received no advance notice of layoffs or plant shutdowns, while blue-collar workers in nonunion establishments received an average of only two days notification.
>
> Under the current voluntary system of advance notice, the costs of plant closings in which advance notice is not provided are borne primarily by the taxpayers (including other employers) and the affected workers—employers choosing to close without advance notice create an externality, reflecting the fact that the costs of such actions are not fully taken into account by employers. Requiring advance notice can redistribute the costs of layoffs and plant shutdowns. Federal action to broaden the coverage of workers by advance notice also follows in an established tradition of actions to improve the functioning of market

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[89] Ibid., p. 6.

> mechanisms (e.g., securities market regulation, consumer protection statutes and regulations) by ensuring that information available to one party to a transaction is not employed strategically or otherwise manipulated (as in the case of "insider trading" on Wall Street).
>
> Reflecting these considerations, the Panel recommended that federal action be taken to broaden the coverage of the U.S. workforce by advance notice, with appropriate provisions to exempt small firms and those firms encountering unforeseen business circumstances. The Panel recommended either a federal requirement for advance notice or a tax-based incentive plan, which would combine tax credits on the corporate income tax with surcharges on federal unemployment insurance taxes to reduce the tax burden on firms providing advance notice.[90]

Mowery also noted that the issue of added costs to firms resulting from advance notice was discussed by the management representatives on the panel, most of whom were experienced in providing notice. None of these representatives felt advance notice made a significant contribution to the costs of doing business.[91]

Nor, according to Williams, is there evidence that people stop working when they are notified of plant shutdowns:

> The truth of the matter is that people work harder . . . usually in some desperate attempt to try to have their employer understand that they ought to continue the operation. . . .[92]

Ginzberg recommended 90 day notice for plant shutdown for all units of 100 or more employees:

> If you can have management have all kinds of these golden parachutes, the least you can do is if you've had a worker for 25 years on your payroll, to give him a couple of months notice.
>
> I think from my studies back in South Wales in the coal mining areas in 1939 . . . one of the most important things is to communicate as early as possible to workers as much reality of the changes that are going to face them as possible, because they will then begin to do something about it.[93]

Lawrence put it this way:

> Let me just say my view is that [advance notice of] closing, of course, isn't panacea. But I am struck that none of us find it very peculiar that in the property market a landlord is required to give the tenant 30 days' notice. We sort of take that as almost a norm. And I believe that the same kind of norm of just basic human decency—the fact is that a job is more important to people than where they dwell probably. And it just seems to me that dropping people,

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[90] Ibid., pp. 89–90.
[91] Ibid., p. 126.
[92] Ibid., p. 126.
[93] Ibid., p. 125.

> particularly when it's en masse, in an environment is just something which is basically inhuman. And so, I think it has an efficiency cost.
>
> But I also believe that there are times—as I say, I haven't seen the property market come grinding to a halt as a consequence of mandatory advance notification for property, and I would do the same for plant closing.[94]

Anne O. Kruger, a member of the National Academy of Sciences panel represented by Mowery, opposed mandatory advance notice:

> Advance notification of layoffs is undoubtedly beneficial to those workers who will lose their jobs. If there were no negative side effects associated with advance notification, it would clearly be beneficial to all.
>
> There will be several side effects, however, if notification is mandatory. First, the necessary enforcement apparatus would increase the cost of doing business. Second, for all firms, but especially for risky ones, knowledge that layoffs could not be made on short notice would increase incentives to use capital and hire fewer workers. To the extent that fewer jobs would be created, the proposed requirements would hurt the employment prospects of those the proposal is designed to assist. That mandatory periods prior to layoffs can result in smaller levels of employment has been well documented in a number of developing countries. Third, requirements of advance notification reduce the flexibility of firms already in difficulty. The requirement is, in effect, the same as a tax for these firms.
>
> I conclude that advance notification is desirable, and efforts to educated employers of its value to employees should be encouraged. With respect to mandatory notification, however, I believe that the evidence is far from sufficient to warrant such a step.[95]

Strassmann also expressed his opposition to plant closing legislation because he felt it was impractical and would not achieve its purpose. He suggested instead a profit-sharing plan which he believes would be more effective in alleviating the basic problem:

> First, 90 days is just not enough for somebody to be able to reconfigure their life. So I think it is falling far short of really being a helpful solution to a much deeper endemic kind of a problem. If you are a chemical worker or a steelworker, 90 days just won't do much for you.
>
> My feeling, based on study, is that those companies that are involved in gain sharing where, in fact, the workers have much greater understanding and information about the profitability of the company—and we have a number of very successful examples of that—those workers have a long-term understanding and information about the competitive viability of the firm, and they are able on a long-term basis to make judgments which are necessary to

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[94] Ibid., pp. 126-127.

[95] Ibid., p. 118.

> adjust their whole style of living and their direction and exercise individualized choices.[96]

In addition to giving workers information about the profitability of their firm, Strassmann believes that profit-sharing has a number of other advantages:

> The Japanese as well as a small, but significant, number of U.S. companies practice some form of *gain-sharing*. This is an approach which allows for only a portion of income to come from wages. A large fraction, sometimes exceeding 50 to 100% of base pay, is earned on the basis of the overall performance of the enterprise and on an individual's contribution to its success.
>
> The theoretical meaning of any *gain-sharing* is far-reaching. It implies a departure from the traditional theory of wages and how wages are set. As an active participant in the success or failure of a business the employee cannot be seen any more as someone who just rents his time at a contract wage rate. The employee becomes partially an owner because he contributes not only labor but also *capital* in the form of his knowledge and personal involvement. Thus, as any investor, he shares not only in risks but also in the gains.
>
> The policy consequences of a widespread adoption of *gain-sharing* are far-reaching. For instance, it would suggest that all *gain-sharing* should be treated as *capital gains* and not as income. This would change tax laws. It would also alter the way how individuals perceive their ability to influence the workplace and working conditions.
>
> Firms that use some sort of gain-sharing show better productivity, enhanced job-information, improved industrial relations, greater competitiveness and superior social concerns, thus relieving much of the persistent pressure for ever increasing amounts of legislative and regulatory actions.
>
> The lessons to be learned from businesses that treat their employees as part-owners should influence Congress to adopt a national policy supporting gain-sharing.[97]

7. INDUSTRIAL ADJUSTMENT

Although there was strong agreement that high priority should be given to developing public policies for addressing worker and community dislocations, many observers are skeptical about the advisability of federal intervention to restore specific industries.

Most economists argue that increased protection worldwide would have adverse economic consequences. Many groups throughout the industrialized world find protection against their own best economic interests. And the long-run experience of countries such as Great Britain indicates that the longer the domestic adjustment process is put off, the greater the damage to the economy. Indeed, it may be counterproductive for many of the workers it is intended to assist by delaying retraining and reemployment in new industries.

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[96] Ibid., p. 126.
[97] Ibid., pp. 155–156.

Lawrence concludes:

> I personally am very skeptical of coordinated orchestrated programs in order to deal with decline in a specific industry. I believe if an industry is being injured as a result of imports, it should come to the International Trade Commission (ITC), it should prove that it is being injured, a declining tariff should be provided in the form of protecting that sector.[98]

The Institute for International Economics reaches similar conclusions based on studies of troubled industries:

- Special protection as practiced in the United States rarely enables industries to regain their share of the domestic market or maintain their former level of employment without indefinite government protection, although in some cases protection has facilitated the transition to smaller and more modern firms which appear able to survive without continued protection.
- Protection imposes "huge" costs on consumers. "Consumer costs of $20,000 to $85,000 *per job-year saved* are common, with figures sometimes as high as $150,000 . . . These costs represent a giant off-budget transfer from consumers on the one hand to producers and foreign suppliers on the other." Total costs are about $27 billion per year in Phase III of textiles and apparel, about $6.8 billion in Phase II of carbon steel, about $5.8 billion in automobiles, about $5.5 billion in dairy products, and more than $100 million in most other on-going cases.
- Compared to these total costs, protection saves a "rather modest" number of jobs in most of the affected industries. Apart from textiles and apparel (640,000 jobs) and automobiles (55,000 jobs), estimates of jobs saved in other industries are "decidedly small", seldom exceeding 10,000 workers. The protection serves to slow the decline in production jobs—sometimes more, sometimes less—but the total number of jobs almost always drops. Moreover, estimates of jobs saved "probably exaggerate the economy-wide employment losses induced by special protection." Although they do not include "white collar employees, workers in ancillary industry (for example, workers making tires for automobiles), or retail and service employees in the immediate locality," they also make "no allowance for the fact that higher costs in the protected industry undermine competitiveness in industries that use protected goods as inputs, or for the fact that higher prices erode real consumer purchasing power."
- Moreover, this protection often lasts "far longer than necessary for the adjustment of the *existing* labor force." It may serve only to delay worker readjustment. "The fact that costs to consumers per production job saved are so high underpins

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[98] Lawrence, Robert Z. and Litan, Robert E. "Why Protectionism Doesn't Pay." *Harvard Business Review,* May-June 1987, pp. 60–67.

the strategy for an alternative approach that would liberally compensate departing workers for moving to new industries or early retirement."

- Protection may allocate resources to "America's least promising industries. Almost by definition, industries that need special protection are industries that have lost their competitive edge in the world economy. These industries do not draw on the comparative strength of the U.S. labor force" or of U.S. technology.
- Moreover, protection is inequitable with respect to these industries: "Large industries with political clout—dairy, apparel, automobiles—are able to shake the U.S. political system for massive benefits. Small industries with only regional influence—footware, copper, CB radios—at best get escape clause relief and often get nothing." [99]

Despite these considerable problems, special protection as practiced in the United States is "far from the worst system imaginable" and has the advantage of not "freezing the status quo": But a system that provided declining tariffs for a specified period of time would be superior. At the same time, policies should be designed to help workers move into internationally competitive industries:

> The more that labor moves into enterprises with growing national and global sales prospects, the less will its interests be served by trade protection. Certain workers will inevitably suffer when the structure of economic activity changes, as it must if firms (and nations) are to keep their competitive positions. *But it would be neither fair policy nor good trade politics to make labor bear this burden alone*-[emphasis added].[100]

Some analysts also argue that the "proper government response to import competition should *not* entail an infusion of public capital or coerced private investment":

> New investment should remain the province of private initiative, undertaken only when cold calculations persuade businessmen that they can withstand the pressure of unfettered international competition.
>
> . . . new investment and new research endeavors are welcome—but only when they flow from private initiative and only when private firms understand that they must ultimately meet world competition. Reliance on private investment does not mean that beleaguered industries will necessarily wither away. Very substantial cost differences separate the strongest firms from the weakest firms in every industry—footwear, autos, apparel, textiles, steel, meat, dairy, and others. With well-conceived strategies, many of the strongest firms will survive.

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[99] Hufbauer, Gary Clyde and Rosen, Howard F. *Trade Policy for Troubled Industries,* Institute for International Economics, Washington, D.C., March 1986, pp. 1-43 and 67-94 and Hufbauer, Gary Clyde, Berliner, Diane T. and Elliott, Kimberly Ann. *Trade Protection in the United States: 31 Case Studies,* Institute for International Economics, Washington, D.C., 1986, pp. 1-29.

[100] Destler, I.M. and Odell, John S. *Anti-Protection: Changing Forces in United States Trade Politics,* Institute for International Economics, Washington, D.C., September 1987, pp. 1-7 and 125-140.

> Moreover, trade protection may provide a respite for industries to modernize, but modernization is not always the answer. In come cases, problems stem primarily from competition from cost-effective domestically available substitutes. Exit rather than modernization [may be] the appropriate strategy. . . .
>
> Experience with integrated carbon steel production, an industry that has come to symbolize industrial decline, illustrates the converse of successful adjustment. In three major countries—the United States, the United Kingdom, and Germany—trade protection and other assistance measures have been justified by images of new investment that would avert steel shortages and lead to the revitalization of old mills. The economic reality has been an extensive and pervasive decline of demand, made worse by competition from low-cost suppliers both abroad (primarily developing countries) and at home (mini-mills). Governments have used different methods to deal with this competition, ranging from huge subsidies for a state producer (British Steel Corporation), to sporadic trade protection (the United States), to permanent trade protection coupled with large subsidies (the Federal Republic of Germany). None of these strategies has succeeded in enabling firms to compete with korean or Japanese steel.[101]

Moreover, in a country like the United States with a highly developed capital market, potentially profitable industries have access to private financing:

> . . . If an industry can be profitable once it has attained enough capacity or experience (in the case of the infant industry) or when it has re-equipped itself (in the case of the recuperating industry), what prevents if from entering the capital market to get the finances to tide itself over until it is profitable? Why can't private participants in the capital market recognize these opportunities? The industry rejuvenation rationale for special trade assistance implies a serious failure in the capital market.
>
> The United States, however, has the world's best developed capital market. With so many suppliers of capital and such a sophisticated system of financial intermediaries to channel their funds to capital users, there is no reason why the market should systematically fail to recognize and underwrite industries that seem to have a future in the international marketplace.
>
> Those who want the government to help rejuvenate industries often claim that the recovery of single companies would help the entire industry. In the case of underdeveloped countries with primitive capital markets, this argument might be valid. But even then, the best approach would be direct capital subsidies instead of tariffs or quotas that add to the consumer's cost. When an industry

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[101] Hufbauer, Gary Clyde and Rosen, Howard F. *Trade Policy for Troubled Industries*, Institute for International Economics, Washington, D.C., March 1986, pp. 1-43 and 67-94.

> producing a standardized product loses its comparative advantage far more than the passage of time is required to regain competitiveness.[102]

Williams is less sanguine about "transition scenarios which assume the sharp decline or demise of a particular industry":

> Indeed, we would advocate that there be a transition to a more world-class format for the *same* industry. . . . We have reduced . . . employment enormously in agriculture, but we didn't wipe out agriculture. Agriculture exists as a vital part of the American economy and provides an enormous number of service jobs servicing that agricultural industry. . . . We are going to have a smaller work force manufacturing things, but it is vitally important that we continue to have a manufacturing capability because that is what sustains the service industry to look after it.
>
> My main emphasis is upon the need for a forum in which we can coordinate various government policies regarding industrial transition. Congress might, without such industrial coordination, enact measures—based upon the assumption of capacity reduction—to facilitate such reductions by providing economic and tax incentives or antitrust relaxations for closures. An uncoordinated *ad hoc* approach of this type would be a mistake.[103]

Moreover, workers should not bear the primary burden of industrial transition:

> We do . . . recognize that profound structural changes are occurring and will continue. In 1977, there was approximately 160 million tons of steelmaking capacity employing over 425,000 workers. Today, the capacity is near 112 million tons and only 180,000 steelworkers are employed. Adjustment is taking place, but for workers it is traumatic. Emphasis upon new technology is warranted. But there must be a social commitment to workers. So far, we have not been able to develop a forum for the implementation of a social contact. It is that aspect of adjustment or transition to which I urge this Committee's attention.[104]

Ginzberg also commented on the efficacy of past attempts to restore specific industries:

> I am sympathetic to many of Mr. Williams' comments about the devastation that has occurred in many steel communities and to many steelworkers and their families. But I think that a hard look at government interventions in steel will show that it has been costly and of not much help to anybody. My preference is to help the workers, not the

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[102] Lawrence, Robert Z. and Litan, Robert E. "Why Protectionism Doesn't Pay". *Harvard Business Review,* May–June 1987, pp. 60–67.

[103] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987, (No. 32). "The Effects of Technological Change on the Labor Force", pp. 7–8, 142.

[104] Ibid., p. 21.

> firms. After all, we live in a capitalistic world and that means that the consequences of poor management are losses and bankruptcies.[105]

Finally, it is of interest to note that even economists who generally are opposed to coordinated government efforts to protect specific industries, believe some forms of protection may be warranted in certain situations. Lawrence argues for giving troubled industries "a breathing space. Give them a declining tariff, and let the chips fall where they may".[106] I.H. Destler and John S. Odell of IIE conclude:

> The policy choices facing the United States and other governments can no longer be captured by a simple, liberal trade-protectionist dichotomy. . . . Actions that restrict trade in the short-run can serve the interests of open trade in the longer run. Measures that reduce imports by enforcing established trade laws can be defended as offsetting (and hence discouraging) trade distortions created by foreign firms or governments. "Protectionist" steps may also, in certain cases, broaden or preserve longer run domestic political support for open trade. Such arguments can be debated. . .[107]

The Issues of the 1990s.—It also is important to design U.S. trade policy in the context of future issues. Harold Malgrem, who was a U.S. trade negotiator, predicts several trends which he believes will substantially change the trade issues in the next decade:

- Because of the low value of the dollar and the "growing resort to unfair trade practices", Japanese companies—and some European and Canadian companies as well—are encouraged to produce within the United States. Most of the new Japanese plants are in Southeastern or Western states, with very little activity in states with the greatest industrial adjustment problems.
- U.S. manufacturers will increasingly find it more economical to buy supplies from foreign-owned plants operating within the United States. "For example, it would be plausible to suppose that imports of automobiles, automotive parts and semiconductors from Japan would be reduced by more than two-thirds the next few years."
- Within the United States, "new technology will bring new industries and new ways of doing business" which could "alter the trade picture—and the regional political coalitions that influence trade policy." Moreover, "the new industrial facilities are characterized by large economies of scale and very small labor requirements. In other words, U.S. industrial output

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[105] Ibid., p. 152.

[106] Hearing before the Technology Policy Task Force of the Committee on Science, Space, and Technology, 100th Congress, First Session, July 1, 1987 (No. 32). "The Effects of Technological Change on the Labor Force," p. 25.

[107] Destler, I.M. and Odell, John S., *Anti-Protection: Changing Forces in United States Trade Politics,* Institute for International Economics, Washington, D.C., September 1987, pp. 1-7 and 125-140.

> could even increase as a share of GNP, although the share of manufacturing jobs in the total workforce will inevitably decline sharply in the next few years. In trade policy terms, foreign and domestic labor costs will be a far less important consideration in trade decisions in the 1990s. What this industrial revolution means in political terms is that the problems of the Rust Belt will intensify, while the manufacturing dynamism of the American economy will continue to shift southward. . . .a look at the demographic forces at work suggests that protectionist sentiment in the U.S. probably won't continue very far into the next administration—regardless of who is President".

Malgrem concludes from these projected trends:

> The issues of tomorrow—and of the next decade will be entirely different: Policymakers will worry about how to maintain technological leadership; about the appropriate role of foreign direct investment; about the interdependence of Mexico, Latin America and other parts of the developing world with the U.S.; about the drift of the European economies away from American influence; about the inevitably growing interest of the Soviets in trade and technology exchanges with Japan and Western Europe and about the international regulation and taxation of service industries.
>
> As a result, we need to shape trade policy with our eyes on the future, not the past. We need to draw into the formulation of trade policy the opinions of our industrial winners, our scientific and engineering community, our financial experts, our defense industry community, our state governments and other important groups that are giving shape to the economy of tomorrow. We have to be realistic about the responses of global industries and global capital markets. Every new policy, whether for exchange rates, trade restrictions or export aids, has long-term effects on the planning of both foreign and domestic businesses and financial mergers.[108]

8. URBAN EDUCATION

Unacceptable conditions in urban schools have reached crisis proportions. Because a large number of urban school children are not being properly educated, the United States can anticipate severe social problems in an economy where a significant proportion of the population may lack the qualifications to compete for middle-income jobs in high technology and information industries. The Board of Trustees of the Carnegie Foundation for the Advancement of Teaching recently concluded:

> . . . America continues to face the very real possibility of the two separate societies envisioned by the Kerner Commission two decades ago. In its prophetic statement, the Commission warned of a social and economic division

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[108] Malgrem, Harold. "U.S. Trade Policy—Stumbling Back to the Future", *The International Economy*, October/November 1987, pp. 82–87.

in the nation "so deep that it would be almost impossible to unite.[109]

Equally discouraging is that many who will be "left out" could have become high achievers. Thus, the entire society will lose. Nowhere will this problem be more acute than in America's high technology economic development which depends on the expertise of its engineers and production workers. And it represents a serious personal loss to those young people who will be relegated unnecessarily to low-paying jobs or to unemployment.

The Board of Trustees of the Carnegie Foundation concludes:

> In almost every big city, dropout rates are high, morale is low, facilities often are old and unattractive, and school leadership is crippled by a web of regulations. . . . the failure to educate adequately urban children is a shortcoming of such magnitude that many people have simply written off city schools as little more than human storehouses to keep young people off the streets. We find it disgraceful that in the most affluent country in the world so many of our children are so poorly served. [110]

The following facts illustrate the seriousness of the problem:

- The national dropout rate is almost 700,000 students per year.[111] In urban schools, about a third of the students leave before completing high school.[112] At one high school in Los Angeles, the figure is 70 percent;[113] in Detroit, the high school dropout rate is 41 percent overall, 80 percent in the worst inner-city schools:[114] While the dropout rate among nonwhites has slowed, academic failure rates continue to be considerably higher for minority students than for whites. This gap persists precisely at a time when black and Hispanic students represent a growing proportion of the population.[115]
- The students who remain in school have high truancy rates: "In New York City, at academic high schools geared to prepare students for college, . . . one out of every five students was absent on any given day. And in four of those schools, the absence rate approached one in three. 'I made guest appearances when I was enrolled,' said a student who transferred to an alternative high school." [116]
- Reading scores are well being national averages: "At a Chicago high school, only 10 percent of the entering tenth graders were able to read effectively. In New Orleans, the average high

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[109] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools,* Princeton, New Jersey, 1988, p. xi.

[110] Ibid., p. ix.

[111] Ibid., p. xi.

[112] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools,* Highlights of Comprehensive Carnegie Foundation Plan for Urban School Improvement, Princeton, New Jersey, 1988, p. 1.

[113] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools,* Princeton, New Jersey, 1988, p. xi.

[114] *Time,* "Getting Tough", February 1, 1988, pp. 52-55.

[115] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools,* Highlights of the Comprehensive Carnegie Foundation Plan for Urban School Improvement, Princeton, New Jersey, 1988, p. 1.

[116] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools,* Princeton, New Jersey, 1988, p. x.

school senior was reading at a level exceeded by 80 percent of the students in the country. In a Houston Elementary school, half the students had to repeat a grade because of unsatisfactory academic progress. . . . Seventy-five percent of the high school freshmen in Chicago had reading test scores below the national average, and only five of that city's 64 public schools had averages approaching national reading norms. Only 229 of the 1,918 students in one Los Angeles high school scored at grade level in reading. . . . The city-wide Educational Coalition in Boston . . . concluded: 'Not only do 40 percent of [Boston's] high school students drop out before they reach 12th grade, but over 40 percent of these who reach 12th grade score below the 30th percentile on a standardized reading test. They may graduate but they are functionally illiterate.' "[117]

- In addition to substandard physical surroundings, many urban students and teachers must deal routinely with violence, drugs, and other social problems: "In Boston schools last year 55 students were expelled for carrying guns and 2,500 must report to police probation officers for past offenses". A principal in New York asked for a transfer from a high school "where he had clearly lost control of violence-prone students and where students in the cafeteria stomped a girl so brutally they broke her ribs". A high school principal in Philadelphia "talks of confiscating crack bags from student pushers in a neighborhood torn by gang wars and racial strife. . . . In St. Louis, 1 of 4 girls in public schools becomes pregnant before reaching her senior year. . . . In Philadelphia, an administrator describes conditions at an inner-city school: "people coming to class high, not just pupils but teachers as well; filthy bathrooms, gang intimidation, nowhere to hang coats without being stolen." [118]

There are some exceptions. The Carnegie Foundation describes outstanding principals and teachers "who have turned failing schools around":

> One junior high school principal in New York City's South Bronx, for example, has built a reputation of excellence that even attracts recruiters from elite private high schools. In Los Angeles, a principal with vision has inspired both teachers and students to high levels of achievement. There are gifted teachers who believe in students and conduct their classes with the expectation that learning will occur. . . .[119]

But for most inner-city students the situation is grim. The Carnegie Trustees conclude that improving the education of urban youth is the "most critical issue the Foundation has addressed.[120] Failure to improve urban schools will have serious consequences for the ability of inner-city students to compete for middle-income jobs and, indeed, for the nation's economic strength.

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[117] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools*, Princeton, New Jersey, 1988, p. x.

[118] *Time.* "Getting Tough", February 1, 1988, pp. 52–55.

[119] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools*, Princeton, New Jersey, 1988, p. ix.

[120] The Carnegie Foundation for the Advancement of Teaching. *News*, March 15, 1988, p. 2.

According to the Carnegie Trustees:

> . . . This nation must confront, with urgency, the crisis in urban schools. Bold, aggressive action is needed now to avoid leaving a huge and growing segment of the nation's youth civically unprepared and economically unempowered. This nation must see the urban school crisis for what it is: a major failure of social policy, a piecemeal approach to a problem that requires a unified response.[121]

The Carnegie Trustees recommend a plan organized around four priorities:

- Affirming that every student can succeed: "Urban schools should have high expectation for all students, not just the most advantaged."
- Building an effective governance arrangement:

> The excessively centralized bureaucratic control of urban schools must end. . . . [But] each school must be held accountable for its work. . . . Principals and teachers in many cities are caught in a governmental system more preoccupied with paperwork, it seems, than with learning. When tight control by public agencies is rooted in the call for accountability, the reality is that principals are often held responsible for the bureaucratic rather than the educational aspects of their work. By mandating, in detail, how schools must be run, the professionalism of the staff is undermined and individual teachers are robbed of authority to act. . . . [Moreover,] in the most troubled schools, teachers, with good reason, do not feel safe in the halls, in the parking lots, or even in the classrooms. Violence levels are high and assaults against teachers are not uncommon. A Carnegie Foundation poll of teachers nationwide revealed that over half the teachers in urban schools consider vandalism and disruptive class behavior a problem in their schools. . . . every school should have not only high expectations for academic achievement but high expectations for conduct too. Standards of discipline must be consistently and sensitively enforced throughout the school. Education and civility are linked.

- Introducing at every school a comprehensive program of renewal:

> Special emphasis should be given to preschool and early education. . . . School size is crucial, too. All urban schools should be organized into small units—schools-within-schools—to make it possible for teachers to work together and overcome the sense of isolation felt by young people in the inner city. Every student should be well known and counseled by a caring mentor. Every school should have clearly defined goals and . . . curriculum. . . . The urban school should be flexible in its scheduling arrangements. . . . Good facilities are essential. Federal support is needed to permit the refurbishing of old build-

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[121] The Carnegie Foundation for the Advancement of Teaching. *News*, March 15, 1988, p. 4.

ings and the construction of new facilities so students can learn in safe, attractive settings.

- Creating a network of support beyond the school. Urban school systems cannot accomplish these changes in isolation:

  > Parents, college teachers and business leaders, as well as government officials at the state and national level, must be partners in renewal. [122]

In a statement accompanying the report, Ernest L. Boyer, Foundation President, recommended a National Forum on Urban Schools:

> The President should declare that effective education for *all* children is a top priority for the nation. What we need is a National Forum on Urban Schools—a meeting at the summit, perhaps convened by the President, to bring together influential leaders from every major sector. The Forum would be an ongoing organization, leading the crusade for more local, state, and federal support and monitoring progress in urban schools. The goal should be to have quality education for all children by the year 2000.
>
> Once America was challenged to land a man on the moon within a decade. And we did. This same spirit must be directed toward the education of our least advantaged children. In saving an imperiled generation, we save ourselves. [123]

The Carnegie Trustees acknowledge there are no quick fixes. The problems of urban schools reflect more general societal problems. The Trustees recommend a new National Urban Schools Program "similar in spirit" to the Rural Extension Act to help farmers. While not reducing state and local responsibility for education, the program would provide additional federal support for basic skills programs, facilities, school innovation, and other central city education programs.

As part of increased federal support for urban schools, a grants program inviting urban school districts to submit bids to establish pilot programs would provide useful information. Districts could propose programs in one or a combination of areas on a trial basis. A number of programs have shown evidence of make a difference:

- Small school units as recommended by the Carnegie Trustees. Small school size by itself does not increase student achievement. But, if managed well, small schools provide learning and motivational opportunities which are more difficult to achieve in less personal environments.
- Magnet schools which provide a general or specialized curriculum to students from across the school district. These schools typically attract additional resources but may have the disadvantage of reducing resources available to neighborhood schools. Like small schools, magnet schools provide increased learning opportunities. In some school districts, they also have

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[122] The Carnegie Foundation for the Advancement of Teaching, Board of Trustees. *An Imperiled Generation: Saving Urban Schools*, Princeton, New Jersey, 1988, pp. XI-XIV and 5-7.

[123] The Carnegie Foundation for the Advancement of Teaching. *News*, March 15, 1988, p. 2.

attracted the middle class, both black and white, back into the public schools.

- College scholarship programs designed to increase achievement by offering financial assistance to eligible students. Current scholarship programs range from city-wide programs supported by local industry and foundations to the widely publicized examples of classrooms "adopted" by wealthy sponsors who offer college scholarships as well as high school tutoring and other support services. Under the federal grants program proposed here, school districts, might bring existing sources of support to students' attention, raise funds from local businesses and foundations, or use some of the grants money to provide direct scholarship assistance.
- Community support programs. Industry and university support has increased the effectiveness of schools in some inner cities by offering both financial assistance and direct services—college scholarships, guaranteed employment to high school graduates, special university services to entering students, and services ranging from accounting to tutorial help in the public schools themselves.[124]
- Plans to encourage principal and teacher accountability. Under these plans, individual principals and teachers are given more responsibility for education but also are accountable for results. Effective plans set realistic goals: The point is to measure student progress but schools are not expected to meet arbitrary test cutoff points.[125]

Each of these programs requires resources which may not be available under districts' current budgets and constraints. A federal grants program with a strong evaluation component would give central city districts an opportunity to carry out and assess programs they consider potentially effective. These programs constitute one step in addressing a complex problem which goes well beyond the education system. But as part of a broader national focus on inner cities, they would provide information useful to other cities—as well as to states and the federal government—in setting future priorities for urban education.

9. Basic Skills Competencies

Basic competencies in communication and problem solving skills are expected to become increasingly important in the workplace of the future.

Ginzberg suggests:

> The Federal Government [should encourage] state and local governments and the private sector to provide second and third chance opportunities to young people who drop out of high school lacking basic competencies—arithmetic, reading, communication—without which they can't get or hold a job in the service economy that currently provides 3 out of every 4 jobs. Good technology without a competent labor force is not the answer to our economic future.[126]

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[124] From a forthcoming Rand Corporation report.

[125] Ibid.

[126] Ibid.

These basic skills programs would be more effective if they were linked to jobs. Ginzberg recommends a federally funded jobs program with a basic competencies component:

> Since the young people who drop out of school have a negative image of the educational process, it is important to try to reduce the dropout rate by offering them part-time jobs in which they may be interested. Similarly, after they drop out, one cannot get them back into school simply for remedial work. Such an effort must be linked to jobs and training.[127]

Indeed, these programs may help prevent some of the costly worker readjustments necessitated by industrial transition:

> . . . retraining is important for people who have the competencies to be retrained. . . . But if you don't have the basic educational competencies, you can't be retrained. A lot of the automobile workers' experiences in retraining, especially in the Los Angeles area, from automobiles to computers, did not work.[128]

Williams reached similar conclusions:

> We need to try to focus in terms of results, try to relate training to job prospects that might be available . . . but on a parallel track . . . we should be working at the basic skills . . . at language, at education, and at computer literacy.[129]

But Williams feels we do not do a very good job of educating our entire population:

> . . . the top half of the work force in America, we do a great job. Our universities are world class, and in all of these we're competitive. From the middle down we do a very poor job. And we do that poor job in a variety of places. We don't do it too well in our school system. . . . On the industry side of it, we don't do in-house training nearly as well.[130]

Ginzberg's major concern is that "many minority youth are coming into the labor force blocked from competing for mainline jobs" because of high dropout rates in the inner city. In his view:

> . . . American society is at risk if a significant minority of all our citizens cannot become self-supporting.
>
> We have a whole section of our population that is cut off from the new work force. That is the single most serious problem that I see in the American economy today.
>
> And that means that since I don't believe we can restructure the elementary and secondary schooling very quickly—my colleague used to say it took 40 years to get an innovation into the educational system—we have to have second and third chance opportunities. In World War

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[127] Ibid., p. 154.
[128] Ibid., p. 3.
[129] Ibid., p. 131.
[130] Ibid.

> II, I was in charge of a considerable part of the teaching of illiterates. They weren't total illiterates. We took them in the Army—300,000 of them. And we brought them up to snuff pretty quickly. That was one of my Eisenhower studies called "The Uneducated".[131]

But Ginzberg remains optimistic about the ability of the economy to provide jobs for young people:

> . . . I think when you're dealing with younger people, the important thing to do is to have hopefully the economy buoyant enough that with some kinds of money for counseling and job search and so on, you can move people around.
>
> We saw that a large number of workers out of Detroit went to Houston. Then Houston fell on its face, so they had to go back to Detroit. But by and large, if you're in the younger age groups, I think the outstanding feeling that I have about the American economy is that in a continuing expanding labor market—and we have had more and more jobs—the younger people can by and large make it.[132]

10. MATHEMATICS AND SCIENCE ACHIEVEMENT

International comparisons of mathematics and science achievement point out weaknesses in American education, although the extent of the problem tends to be overstated.

The most widely reported international comparisons, based on 1964 data for mathematics and 1970 data for science, are difficult to interpret because they do not compare equal proportions of high school age groups. These international studies of achievement compared the average score of more than three-fourths of the age group in the United States with, for example, the average score of the top 9% in West Germany, the top 13% in the Netherlands, or only the top 45% in Sweden. The findings show that the *average* high school student in the United States scores lower in international comparisons than the *average* high school student in other industrialized countries.

When the top students were compared, American students scored at about the same level in mathematics as their counterparts in many industrialized countries—though they still scored lower than their peers in Sweden Japan and Israel. Top U.S. students also scored at about the same levels in science as students in other industrialized countries—better than students in France, Belgium, and Italy, not as well as students in New Zealand, England, and Australia.[133]

Preliminary results from a more recent international study of mathematics achievement, conducted in the 1981–1982 school year, show that American students in eighth grade—a grade where students in the United States and other countries are more likely to be comparable—performed at about the international median in algebra, arithmetic, and statistics. In geometry and measurement, the American students scored in the lowest quartile (See Table 4). Not an impressive finding, but certainly a more realistic picture of American mathematics education than the widely reported 1964 findings for 12th graders.

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[131] Ibid., p. 128.

[132] Ibid., p. 8.

[133] Husen, Torsten. "Are Standards in U.S. Schools Really Lagging behind Those in Other Countries?", *Phi Delta Kappan,* March 1983, pp. 455–461 and Rotberg, Iris C. "A New Perspective on Math and Science Education", *Phi Delta Kappan,* June 1984, pp. 668–673.

The 1981–1982 international test comparison for students in the last year of secondary school who were enrolled in advanced college-preparatory mathematics courses show: (1) American 12th grade students, on average, performed well behind the average student in the final year of secondary school mathematics in other countries; and (2) American students in calculus classes performed at or near the international average in almost all content areas (See Table 5). In the United States, about one-fifth of the advanced mathematics students take calculus compared to all advanced students in most countries.

Again, student retention rates differ across countries. Hong Kong, which achieved the highest score on each topic, has a very selective school system. Japan, a close second in mathematics scores, does not.[134] Indeed, Japan has a higher secondary school retention rate than the United States.

A recent comparison of mathematics achievement of students in Illinois and Japan provides further documentation (See Table 6). Since Illinois students perform at about the same level as U.S. students in general, the study is likely to have broader implications than just for Illinois. For this study, a mathematics test was given in 1981 to 1,700 Japanese and 9,582 Illinois high school students.

TABLE 4.—EIGHTH GRADE (POPULATION A) ACHIEVEMENT COMPARISONS: U.S. AND INTERNATIONAL, 1981–82

[Percent of items correct]

Topic	United States (percent correct)	International (20 countries)		
		Lowest quarter of countries	Median	Highest quarter of countries
Arithmetic	51	45	51	57
Algebra	43	39	43	50
Geometry	38	38	43	45
Statistics	57	52	57	60
Measurement	42	47	51	58

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[134] McKnight, Curtis C., *et al. The Underachieving Curriculum: Assessing U.S. School Mathematics from an International Perspective*, a national report on the second international mathematics study, January 1987, pp. V–XIV, 12–29.

TABLE 5.—TWELFTH GRADE (POPULATION B) ACHIEVEMENT COMPARISONS: U.S. AND INTERNATIONAL, 1981–82

[Percent of items correct]

Topic	United States			International (15 countries)		
	Precalculus	Calculus	Total	Lowest quarter of countries	Median	Highest quarter of countries
Sets and relations	54	64	56	51	61	72
Number systems	38	48	40	40	47	59
Algebra	40	57	43	47	57	66
Geometry	30	38	31	33	42	49
Elementary functions/calculus	25	49	29	28	46	55
Probability/statistics	39	48	40	38	46	64

TABLE 6.—MATHEMATICS ACHIEVEMENT MEANS AND STANDARD DEVIATIONS FOR HIGH SCHOOL STUDENTS FROM JAPAN AND ILLINOIS

Variable	Japan (N: 1,700)			Illinois (N: 9,582)		
	Percent	Mean	S.D.	Percent	Mean	S.D.
Sex:						
Male	58	42.08	9.37	50	19.88	9.55
Female	42	36.17	7.73	50	19.32	8.54
Age:						
15	27	34.35	6.79	07	16.72	7.72
16	36	40.73	8.91	80	20.49	9.22
17 or older	37	42.58	9.34	13	15.87	7.34

> For all three age groups (15, 16, and 17 and older), the Japanese exceeded the Illinois students by two standard deviations. . . . Put another way, the average Japanese student outranked about 98 percent of the Illinois sample. At the upper ranges, the differences are still more striking. Only about 1 in 1,000 Illinois students attained scores as high as the top 100 out of 1,000 (or ten percent) of the Japanese students.[135]

Undoubtedly, there are cultural differences that affect student performance. For example, pressure for academic achievement is high in Japan. Japan has a uniform mathematics curriculum prescribed by the central ministry of education; students must take all the prescribed courses, while in the United States students may elect which courses to take. Moreover, as McKnight *et al* note:

> The extent of coverage by U.S. mathematics teachers of topics on the international test was typically at or below the international average for most content areas. . . . Within the United States, coverage varied a great deal among classes. That is, marked differences in opportunities to learn mathematics were found between students.[136]

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[135] Walberg, Herbert J. *et. al. Mathematics Productivity in Japan and Illinois*, unpublished paper, University of Illinois at Chicago and Urbana, reported in Raizen, Senta A. and Jones, Lyle V., editors. *Indicators of Precollege Education in Science and Mathematics*, National Research Council, Washington, D.C., 1985, pp. 122–123.

[136] Ibid., p. VIII.

In addition to the international comparisons, comparisons of U.S. students today with U.S. students in previous years also are useful in identifying major problem areas. Results are mixed:

> In general the achievement test scores of students who are likely to major in science or mathematics have remained high in these areas. Declines are more evident in tests that assess the basic scientific and mathematical knowledge of the general population.
>
> Scores on College Board science achievement tests in biology, physics, and chemistry, taken by the top students among the college-bound population, are as high or higher than they were in the early 1970's. The same is true of mathematics achievement test scores. In addition, scores on College Board Advanced Placement tests in science and mathematics were at least as high in 1983 as they were in 1973, despite increased numbers of students taking the tests. Achievement test scores on the Graduate Record Examination (GRE) show mixed results over the past nine years. Mathematics scores have gone up; physics scores have gone down; engineering scores have remained steady. Recent international assessments shows modest test score gains between 1964 and 1982 for 12th graders taking college preparatory mathematics. All of this suggests that in general our top students do as well or better in math and science than they did in previous years.
>
> The widely reported declines in test scores are based on tests administered to a broad cross section of the population. Even here results are mixed. The National Assessment of Educational Progress (NAEP), which assesses representative samples of elementary and secondary students, shows that 9-year-olds have scored at about the same level in science since the 1972–73 science assessment, while scores for 13 and 17-year-olds have declined. . . . During roughly the same period, mathematics scores on the NAEP assessment have stayed about the same for 9-year-olds, improved for 13-year-olds, and declined for 17-year-olds.
>
> The international study shows a modest decline in 8th grade mathematics achievement. Clearly, results even for the general student body in elementary and secondary school are mixed.
>
> They also are mixed when one looks at test scores for the general college population. The scores of college-bound students on the American College Testing (ACT) Program natural science examination (a broader cross section of students than those who take the College Board achievement tests) have remained approximately the same since the mid-1970's. Mathematics scores for college-bound students on both the ACT exam and the Scholastic Aptitude Test (SAT) declined from the late 1960's to the mid-1970's, when they began to level off. ACT math scores show some evidence of continuing decline, while SAT math scores have remained essentially the same for the past ten years. (The average score was 472 in 1975 and 471 in 1984). The widely

> reported decline in the proportion of high SAT math scores also has been exaggerated. In 1972, 17.8% of college-bound seniors scored at 600 and above compared to 16.6% in 1984. The percentages for 700 and above were 3.5% and 3.3% respectively and for 750 and above, 0.9% and 0.7%. Finally, scores of graduate school applicants on the quantitative portion of the GRE are higher now than they were in the early 1970's.
>
> The declines that do occur are explained in part by increases in the numbers, and changes in the socioeconomic characteristics, of students taking the test. The ACT Program notes that "small changes in average scores can result from a variety of factors, the most notable being changes in the demographic characteristics of the students taking the tests." An advisory panel on SAT scores, reporting in 1976, noted that as much as three-fourths of the decline in scores between 1963 and 1970 can be attributed to changes in the numbers and socioeconomic characteristics of students taking the test, and one-fourth of the decline after 1970 can be accounted for by continuing demographic shifts. Other changes noted by the panel are curriculum changes, television, and changes in family structure. The panel may have underestimated the role of population changes which became more visible after the panel reported in 1976. In any case, changes in test scores that can be attributed to population changes are certainly unreliable measures of the quality of education.[137]

In general, international test score comparisons and comparisons of U.S. test scores across time show strengths as well as problems. But, significant curriculum changes are warranted. McKnight *et al* make several proposals for restructuring the mathematics curriculum. Among these are recommendations for:

> A fundamental revision of the U.S. school mathematics curriculum, in both form and substance. . . . This activity should begin at the early grades of the elementary school.
>
> With respect to form, the excessive repetition of topics from year to year should be eliminated. A more focused organization of the subject matter, with a more intense treatment of topics, should be considered.
>
> Concerning substance, the continued dominating role of arithmetic in the junior high school curriculum results in students entering high school with very limited mathematical backgrounds. The curriculum for all students should be broadened and enriched by the inclusion of appropriate topics in geometry, probability and statistics, as well as algebra.[138]

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[137] Rotberg, Iris C. *On Math and Science Education in the United States,* Remarks delivered at The Johns Hopkins University, April 10, 1985, pp. 11–13.

[138] McKnight, Curtis C. *et al. The Underachieving Curriculum: Assessing U.S. School Mathematics from an International Perspective,* a national report on the second international mathematics study, January 1987, p. XII.

While state and local governments have placed increased emphasis on mathematics and science education, additional reforms in these areas would better prepare students to continue their education in technical fields. The point is to improve course content and teaching skills rather than simply increasing course requirements. The major problem is that the population in general is not well-informed about basic scientific issues or about how to perform simple mathematical applications, such as problem solving. The emphasis of some of the recent education reforms on increasing requirements for traditional science and mathematics courses (and on mandated test programs which encourage coursework that can be measured by objective test items) does little to improve the education of the large majority of students who might benefit more from curricula that are not designed along narrow disciplinary lines.

Unfortunately, these trends to require more courses without revising their structure and content seem inconsistent with some of the more useful mathematics and science curricula of the past 20 years. These curricula refocused the content (for example, by placing more emphasis on statistics and problem solving) and also attempted to give students a chance to understand the development of a limited number of major scientific concepts—but to understand these concepts in depth—rather than attempting to teach a lot of superficial facts in survey courses which are quickly forgotten.[139]

As more advanced artificial intelligence programs are developed, technology-based learning devices, such as computer interactive video disc technology and easy access to reference information stored on laser discs, can make an important contribution to mathematics and science education.

A barrier to implementing curriculum changes is a shortage of mathematics and science teachers who are qualified to teach the new curricula.

> Reported teacher shortages result not only from the simple unavailability of "qualified" math and science teachers, which is very real in certain parts of the country, but also from budget constraints and from surpluses of teachers in other fields. For example, out-of-field teaching, which is used as one measure of teacher shortages, often reflects the placement of surplus teachers of other subjects who cannot be laid off because of their seniority. As a result, this measure may be used to describe shortages in algebra teachers merely because history teachers are being asked to teach algebra—not because there necessarily is a shortage of algebra teachers, but because the history teachers have seniority and cannot be laid off. Further, many school systems are likely to respond to increased math and science requirements by increasing out-of-field teaching, thereby reducing the quality of education in these fields—exactly the opposite of what is hoped for in

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[139] Rotberg, Iris C. *On Math and Science Education in the United States,* Remarks delivered at The Johns Hopkins University, April 10, 1985, pp. 15-16.

> the [educational] reforms. And it is often the lowest achieving students who get the least qualified teachers.
>
> And shortages of math and science teachers do not necessarily mean that these teachers can readily find jobs. For example, the State of Kentucky offered financial incentives for persons to enter teacher training programs in mathematics and science and then found that few available teaching positions existed for the first graduates. And in April 1983—the month in which the National Commission on Excellence in Education released its report, noting "particularly severe" shortages of math and science teachers—the Chicago press reported that the Chicago Board of Education had made substantial reductions in the number of math and science teachers during the past several years. Indeed, Chicago has a surplus of math and science teachers. Many of these teachers were working as substitutes and not necessarily in their fields of expertise. More often than not, such problems arise as a result of financial strain on States and school districts. It is not so much that the teachers aren't needed as that the districts can't afford to hire them.[140]

One reason it is so difficult to attract highly qualified teachers is the enormous increase in bureacratic requirements accompanying recent education reform.

> There are increases in *State* requirements which make Federal regulations (about which there has been so much concern in recent years) seem mild. There literally are thousands of new laws and policies. It is estimated that Colorado alone has 114 new laws affecting public schools. And one observer has referred to California's latest reform bill as a "garbage can"—a collection of everyone's bright ideas about what education should be like. It appears that State legislatures have moved from administrative and finance policies to direct control of curriculum and testing; noneducators seem to be making decisions about teaching principles and other instructional issues, while educators are spending their time worrying about money.
>
> All of this means that schools are likely to become even more boring places, less intellectually stimulating for students—and for teachers as well—then they are now, certainly not a trend that will make it easier to attract outstanding teachers and principals—without whom, of course, the education reforms can accomplish little. As a result of new requirements, teachers will have little discretion to make decisions about instruction and curriculum. Apart from autonomy, the sheet abundance of administrative work will mean less time for students. Unfortunately, these trends seem to run counter to the school effectiveness and management literature which emphasizes the importance of employees having at least the perception of some control over their own working environments. One

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[140] Ibid., pp. 16–18.

observer summed it up this way: "Large size, bureaucratization, and fragmentation run counter to attempts to educate *individuals*. At the core of any genuine effort to provide education is the interaction between teacher and pupil." [141]

11. ACCESS OF LOW-INCOME STUDENTS TO HIGHER EDUCATION

While educational requirements for middle-income jobs are increasing, college enrollments among blacks, particularly men, have decreased in the past several years. As a result, many blacks may not be gaining the education needed to compete for the growing number of jobs in high technology and information industries. Black high-school graduates are increasingly going into the military, attending proprietary schools, or taking jobs.[142] But many are unemployed: Black male teenage unemployment is 34 percent, almost triple the unemployment rate for white males.[143]

Kathryn Mohrman, a Brookings guest scholar, describes the trends in college attendance:

> Throughout the 1970s, enrollments of blacks, Hispanics, Asians, and Native Americans grew both in absolute numbers and as a proportion of total enrollments. Between 1976 and 1980, undergraduate enrollments of all minority groups except blacks rose faster than the increase in enrollments among whites. The picture since 1980, however, has been mixed. Total enrollments are down 2 percent, but participation rates continue to increase significantly among Asians and slightly among Hispanics. . . . The distressing element is a 7 percent decline in enrollment among Native Americans and an 11 percent slide among blacks. These numbers are particularly discouraging because the percentage of minority youth graduating from high school is on the rise, yet success at the secondary school level is not translating into success at the college level. Today there are fewer black undergraduates than there were a decade ago.[144]

Analysts give a number of reasons for the low college attendance rates: Many minority youth come from low-income families, high-crime areas, and poor schools.[145] But a major factor may be inadequate funds for higher education:

> From the G.I. Bill in the 1940s to various grant and loan programs created in the 1960s and 1970s, federal dollars have expanded higher educational opportunities far beyond the economic and intellectual elites for whom a

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[141] Ibid., pp. 18–19.

[142] Collison, Michele N–K. "More Young Black Men Choosing Not to Go to College", *The Chronicle of Higher Education*, December 9, 1987, pp. A1, A26–A27.

[143] Wilson, William Julius. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*, University of Chicago Press, Chicago, Illinois, 1987 and Greenstein, Robert. "Prisoners of the Economy", *The New York Times Book Review*, October 25, 1987, pp. 1, 46–47.

[144] Mohrman, Kathryn. "Unintended Consequences of Federal Student Aid Policies", *The Brookings Review*, Fall 1987, pp. 24–30.

[145] Collison, Michele N-K. "More Young Black Men Choosing Not to Go to College", *The Chronicle of Higher Education*, December 9, 1987, pp. A1, A26–A27.

college education was once reserved. In addition to giving millions of students an opportunity to extend their educations beyond high school, these programs have benefited society by developing a better educated citizenry and indirectly supporting a rich diversity of colleges and universities that collectively add to the nation's wealth of knowledge.

Over the last decade, two developments—a decline in the real value of student aid and a shift in emphasis from grants to loans—may have begun to erode the educational philosophy underlying the financial aid programs and perhaps even the public and private benefits those programs have yielded.

Measured in current dollars, total federal student aid has increased 9 percent from 1980–81 to 1985–86, from $14.2 billion to $15.4 billion. During these same years, the number of recipients jumped 22 percent; more than 9.4 million grant and loan awards were made in 1985–86, assisting the majority of all students enrolled in formal education beyond high school.

When the data are converted into constant dollars, however, they show that the real value of federal student aid declined significantly from 1981 to 1986, after increasing in the previous decade. . . . The value of a typical award has also fallen; the average Pell grant, the main grant program for disadvantaged students, dropped from $504 to $471 in constant 1974 dollars, while the average Guaranteed Student Loan (GSL) declined from $1,255 to $1,022 during those same years. More students are sharing more aid dollars, but that aid is buying less education.

As significant as these decreases are, a more important change in student aid has been the shift from grants to loans. . . . in 1975 only 17 percent of federal assistance was in the form of loans, with the preponderance of support going to students as grants, veterans' benefits, and Social Security assistance. Ten years later, almost half of all federal student aid dollars were devoted to subsidies for student loans. In a single decade, loan programs intended originally for the convenience of the middle class have become the major funding mechanism helping needy students gain access to college. Recent estimates show that half of all undergraduates will finish their college careers with some debt. . . .

A grant is not a loan, and paying for a college education through borrowing is not the same as financing a degree with work or scholarship aid. While loans are an effective and appropriate aid mechanism, they have different effects than grants on students and different implications for colleges and universities.[146]

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[146] Mohrman, Kathryn. "Unintended Consequences of Federal Student Aid Policies", *The Brookings Review*, Fall 1987, pp. 24–30.

Decreases in student grants may have unintended consequences for minority enrollment in higher education. Some minority youth may choose not to enroll at all; others may choose lower-quality institutions to reduce the size of their loans:

> The years of greatest growth in minority enrollments were also the years of substantial increases in federal student assistance. . . .
>
> Limitations on student aid are often cited as an important cause of the downturn in minority enrollments. Both the decrease in grants and the shift from grants to loans strike especially hard at minority students from poor families who had relied on grants in the past to pay for a substantial portion of their college expenses. . . . In addition, the burden of repayment falls harder on minorities than on their white male counterparts. Continuing disparities in income by race, even when controlling for other factors, mean that minorities are required to devote a larger percentage of their earnings to debt repayment than other students with similar loans.
>
> How important is financial aid as a factor in the decline of minority student enrollments? Econometric analyses suggest that about 30 percent of low-income students of all races would drop out of school if grant awards were eliminated; in surveys of student opinion, about 45 percent of the same group said they could not enroll in higher education without grant aid. Comparable figures for middle- and high-income students were substantially lower. Compelling evidence on the implications of the growing dependence on loans comes from a longitudinal study of minority and white high school seniors in 1980; it found that government grants increase the likelihood of attendance at a four-year college or university, while loans do not affect participation in higher education. The shift from grants to loans, then, is exacerbating the problems of helping disadvantaged students go to college.
>
> . . . The drop in both the number and the proportion of minority students in postsecondary education is disturbing for several reasons. Fewer blacks in particular will be qualified with a college degree to become the professionals that this nation will need in the years ahead. . . .
>
> [Moreover,] many studies have shown that one of the most important factors influencing the decision to go to college is parental educational level. If today's minority high school graduates choose not to participate in further education, out of concern for loan burdens or for other reasons, their children may not be as likely to go to college as the next generation of white and Asian students. Not only is this nation failing to reach its goal of equal educational opportunity for today's young people, but it is sowing the seeds for continuing gaps in the future.[147]

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[147] Ibid.

One way of dealing directly with the financial problems of low-income students is to redirect federal aid for loans back to grants, as Mohrman recommends. Another is Lawrence's proposal, described earlier, for a federal loan program with repayment through income taxes contingent on future income. Currently there are small scale programs which link loan repayment to income, for example, Harvard Law School's loan forgiveness programs for students entering public service and the Education Department's experimental income-contingent repayment plans.[148]

12. CONTINUING EDUCATION OF THE LABOR FORCE

The technological revolution has accelerated changes in the workplace which will require most people to learn new skills—and sometimes new careers—throughout their lifetime. *The Economist* concludes:

> Two things are certain. One is that, over the coming five years, four out of five people in the industrial world will be doing jobs differently from the way they have been done in the previous 50 years. The other is that, outside a tiny group of technocrats, most people are going to have to go back to school, sooner or later, to learn how. . . .
>
> The difficulty is that the half-life of people's knowledge is contracting so fast that it now almost equals the time taken to acquire it. Take an electronics engineer or computer scientist graduating in the summer of 1987. Whether from Caltech, Stuttgart or Tokyo, half the knowledge he (or increasingly she) has acquired over the past four years at university will be old hat by 1992. The engineer will then have to go back for "repotting" if the employer is serious about keeping abreast of competitors.[149]

The United States has what *The Economist* calls a "vast non-system" of higher education and training for adults. Large numbers of adult Americans attend colleges and universities or take courses sponsored by a range of other organizations—corporations, labor unions, professional associations, government organizations. It is estimated that more than 45 million adult Americans—more than a quarter of the adult population—are currently taking courses. Approximately 8 million adults participate in corporate training programs alone.[150] According to *Science,* "the dollars spent and the numbers of company students trained are comparable to the totals experienced by all the country's 4-year colleges and universities." [151]

Drucker notes:

> . . . educators will have to accept that schooling is not for the young only and that the greatest challenge—but

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[148] Ibid.

[149] *The Economist.* "Training for Work: In Search of Missing Skills", December 20, 1986, pp. 93-101.

[150] Ibid.

[151] Abelson, Philip H. "Continuing Education for Blue-Collar Workers", *Science,* November 13, 1987, p. 875.

also the greatest opportunity—for the school is the continuing relearning of already highly schooled adults.

So far we have no educational theory for these tasks. . . . But in the United States, at least, practice is far ahead of theory. To me the most positive development in the last twenty years, and the most encouraging one, is the ferment of educational experimentation in the United States—a happy by-product of the absence of a "Ministry of Education"—in respect to the continuing learning and relearning of adults, and especially of highly schooled professionals. Without a "master plan," without "educational philosophy," and indeed, without much support from the educational establishment, the continuing education and professional development of already highly educated and highly achieving adults has become the true "growth industry" in the United States in the last twenty years.[152]

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[152] Drucker, Peter F. *Innovation and Entrepreneurship: Practice and Principles*, New York, Harper & Row, 1985, pp. 253–260.

IV. INVITED PAPERS

The American Society of
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Statement

on

Industrial Transition: Public Policies for the Labor Force

for the

Technology Policy Task Force
Committee on Science, Space and Technology
U.S. House of Representatives

Prepared by

a

Task Force of the Council on Education
The American Society of Mechanical Engineers
August 17, 1987

We are pleased to respond to the Technology Policy Task Force's request for comments on issues related to industrial transition and public policies as they apply to the labor force. These comments focus on the engineering labor force and represent the considered views of a task force of the Council on Education of the American Society of Mechanical Engineers, rather than an official position of ASME.

Executive Summary

We offer the following policy recommendations relating to industrial transition and the engineering work force:

1. Life-long education should be recognized as a public good, no less deserving of public support than formal education. At a minimum, federal tax incentives for continuing education and retraining should be continued and strengthened.

2. As the nation's largest employer of engineers and scientists, the federal government should more aggressively promote continuing education.

3. State and local educational authorities should be encouraged to upgrade math and science requirements for high school graduation.

4. Government at all levels should continue efforts to encourage closer ties between academia and industry.

5. The federal government, along with private industry, should actively encourage the entry of more engineering baccalaureates into graduate work through appropriate fellowships, grants and forgivable loans.

6. The current efforts of the National Science Foundation to encourage inter-disciplinary studies and institutes should be enlarged, but not at the cost of other existing engineering research programs.

7. The federal government should place a higher emphasis on support for updating and upgrading teaching and research equipment in American universities.

Introduction

The nation's ability to accommodate continued technological change and to provide leadership in the world marketplace depends in large measure on a strong cadre of well-educated, up-to-date and innovative engineers who can formulate, analyze and solve problems in new technical areas. This is demonstrated by the fact that technological leadership of the U.S. in the world market has been greatest for those products which have a high engineering component, i.e. the engineering cost is a significant portion of the product cost. Examples of such products include mainframe computers, aerospace equipment and medical electronics.

At the same time, industry must learn to produce these products more efficiently and at lower cost. This may require not only changes in manufacturing procedures, including computer-aided design, computer-aided manufacture and automation where economically justifiable, but also a difference in design and production philosophy. Quality and maintainability must be designed into all aspects of a product right from the beginning. This is certainly one lesson U.S. manufacturers are learning from their Japanese counterparts.

In looking at technological challenges facing the nation, we should not make the mistake of only looking at past shortcomings. We should look at a moving target to find out where our international competition may be going, rather than where they have been. It is only when we anticipate technological changes over perhaps the next decade that we can assume a proactive stance instead of simply fixing past errors.

Here the continued impact of the computer revolution will play a major role. More and more complex systems and their components will have to be modeled and analyzed via computers prior to prototype testing. The computer, together with applicable standardized expandable data bases, will provide a tool not only for design, manufacture, testing and quality control, but also will allow the integration of systems and performance evaluations and estimates of alternative manufacturing costs. The pressure for tight inventory controls will limit customized components now used in many products; and greater use of more standardized base components with fewer specialized subcomponents will have to be encouraged.

The above issues, which deal primarily with engineering, are not intended to remove pressures from improved management and marketing. However, it is our belief that in the future, technical management will have to become a more equal partner with business management and marketing than has been the case in many American industries. This is also an area where we can learn from our Far Eastern and European competitors. It should also be noted that even in market-driven technological enterprises, the issue of "what does the customer really want" may have to lead to technological innovation.

Pre-College Education

Technical literacy is a must for the nation's labor force. Even those who do not pursue careers in engineering or science will improve their employability and the nation's competitiveness by having adequate math and science training.

Local and state educational authorities must put more emphasis on math and science, including expanded course requirements for high school graduates. Because the stakes are so high, a federal advisory role may be required to help assure quality and performance.

More extensive pre-college math and science education requirements will help broaden the pool of high school graduates, including minority students, who may qualify for college engineering and science programs. By the year 2000, minorities are expected to constitute about one-third of the U.S. population. Therefore, it is essential that minorities, who are currently under-represented in the technical workforce, obtain the necessary pre-college math and science skills to enter college studies in engineering and science.

Engineering Education

The American engineering education system has long realized that engineers must not only be well educated in engineering fundamentals, but that they must also understand the importance of good design of products and processes which are subject to many constraints, including performance, cost, safety, reliability, manufacturability, maintenance, marketability, and conformance with accepted national and international standards.

Engineers must remain "problem solvers" for a host of new and, generally, initially ill-defined problems. However, because of the increasing challenge of ill-defined problems associated with new technologies, more emphasis should be placed on problem identification during the educational process.

Engineers currently graduating with a bachelor's degree generally receive high marks from industry for their technical ability. While employers would always like to see more in the background of the graduate, notably increased communications skills and an appreciation of real-world economics, most employers do not want to see this added at the cost of the technical preparation.

The Congressional Task Force document raised the question, "will retraining be facilitated if engineers have received broad-based education in science, mathematics and the liberal arts, rather than a highly specialized undergraduate training which may provide little foundation for moving into new fields?" Most graduating engineers have adequate training in the physical sciences and mathematics. We believe that additional training in the humanities, while possibly desirable from many points of view, would not be accepted by industry as a substitute for technical competence or for ability to perform during the first two decades on the job. Furthermore, an extended background in physical and mathematical education would simply become rusty by lack of use. Thus in those areas where new physical concepts may have to be developed at the time of retraining (e.g., laser optics, surface physics, superconductivity, etc.), it is our belief that most engineers can do this in a short period of time, provided they have a sound background in the technical fundamentals. This notion is supported by the present low unemployment rate for engineers despite displacement and rapidly changing technology.

Engineering colleges currently appear to be meeting the initial hiring needs of industry to a high degree. Despite serious shortages of professorial staff and other shortcomings, most recent graduates are technically better prepared for the engineering of today than their seniors and superiors who may have graduated 10 to 20 years ago. It is at this 10- to 20-year time period that updating and retraining of engineers may become major issues.

The education of an engineer goes, and must continue to go, beyond that of the physical scientists who primarily ask "what and why"; the engineer has to add the important "how." Thus a broader background at the undergraduate level in non-technical subjects, as contrasted to a broader background in the "engineering sciences," does not appear to be the answer. The recognition that the problem solving aspects of a current engineering education are a valuable asset has also been reflected by the premium salaries paid to MBA's with an undergraduate engineering degree.

Engineering colleges currently suffer from the dilemma of trying to increase engineering science content, design considerations, economics and management planning, and improved communication skills in a nominal four-year program with nothing left to drop from the curriculum. Attempts to make the basic engineering degree a five-year program are objected to by industry representatives; they would not pay higher starting salaries to five-than to four-year graduates. Rather, the broadening and deepening of the program may have to be left to a fifth year which leads to a master's degree. However, probably fewer than half of all current engineering students would seek this alternative; the financial attraction of entering the labor force with the baccalaureate is too strong.

The Congressional Task Force document raised the question of whether engineering education reforms may be needed to place more emphasis on areas such as risk assessment and systems technology. These are issues of real concern to the industrial world but are not easily taught to undergraduate students with limited background and experience. Some subjects simply should and must be left to a more experienced audience by either covering them in graduate work or by subsequent professional development via continuing education.

Graduate education for increasing numbers of engineers, at least through the master's degree, would provide one means of strengthening the "problem solving and identification background" of the engineer. Such master's level education should encourage the use of major design projects in addition to or instead of research-type theses. It could also follow a dual stem. One might be similar to the present educational method which typically emphasizes technical depth in a specialty area. The other method could be more project and technical management oriented.

Much attention has been called to Ph.D. graduates, the insufficient number of potential engineering faculty members and the increasingly large number of foreign graduate students. Ph.D. training, which will remain important is, however, only part of the issue. The upgrading and broadening of sufficiently large number of engineers to have an impact on the national scene requires that more attention must also be paid to master's studies in engineering.

Some of the above issues strongly suggest that closer interaction between engineering colleges and industry must be supported. Significant strides have been made at the research level where university-industry cooperation is rapidly moving ahead. More emphasis must be placed on bringing appropriate engineers from industry into the teaching process via a mutually acceptable and effective mechanism. This must go far beyond the occasional hiring of industry personnel to teach a course; it requires much closer cooperation.

An additional shortcoming of present engineering education is the high cost and rapid obsolescence of technological equipment, including computers and instrumentation, not to mention research equipment. This problem has made it increasingly difficult for colleges to provide their students with the tools that are taken for granted in industry. Most colleges are forced to send their graduates into the industrial world of 1987 with a background based on the tools of the 1960's.

Technological change has not only affected engineers, it has also changed the nature of engineering support personnel. With the advances of computer-aided design, the need for draftsmen and detailers has decreased significantly. On the other hand, technicians trained or retrained in modern instrumentation or in applications of computer graphics for manufacturing design are in greater demand. This provides community colleges and vocational schools with a great opportunity to assume a strong role in training and retraining of technicians. However, most of these schools currently are not qualified to help with engineering retraining.

Continuing Education

Continuing, or life-long education is essential for the professionals who must keep abreast of new knowledge and rapidly changing technology. The half life of an engineer's knowledge base is decreasing as the rate of new technology increases. This includes both knowledge of new materials and processes as well as new advances in the practice of engineering, e.g., computer-aided design. The efficiency and effectiveness of U.S. engineers are on the line and relate directly to our manufacturing strength. If U.S. companies go abroad for their engineering—as they are increasingly prone to do—the likelihood of offshore manufacturing further increases.

Despite the importance of continuing education (CE), U.S. engineers undertake far less continuing education than engineers in Japan and many European countries.

Historically, U.S. engineers have not been self-employed and therefore have looked to continuing education in line with the job demands of their employers. Many employers, for a variety of reasons, have not strongly encouraged continuing education. The exception has been the large technology-based companies with low employee turnover. For many companies one of the reasons for low support is the high turnover of engineers. That is, the benefits of continuing education may not fully accrue to the company. Yet this very independence and mobility of the American engineer is one of the most effective means of technology transfer. It is a powerful force that benefits our economy by providing it with adaptability and flexibility and with a level of inter-company and inter-industry technology transfer that excels over many other countries.

The strategic and tactical redirections of many U.S. companies towards new technologies should have been a boon to continuing engineering education. Yet this has not been the case. Interpretations of corporate goals have sometimes been very narrow and the previous tendencies of many employers to support continuing education (both degree and non-degree oriented) to improve the overall manpower competence of the technical staff and to motivate and interest engineers in the organization has fallen on hard times. Of all the continuing education vehicles, only "in-house courses," i.e., courses contracted for and offered by a company on its own site, have increased, but even they have been limited to a few specific and narrow areas which directly relate to perceived immediate company needs.

It has almost become a truism that engineers only take continuing education courses that help them to do their current job better. Knowledge is not acquired to be stored on a shelf; it is taken only when needed. Thus engineers typically do not take continuing education courses, especially those which provide a theoretical base in novel areas, unless they are at the implementation point or unless their company actively promotes and supports specific programs along these lines. Company support is essential because more than 95% of all participants in continuing engineering education have their costs paid for by the employer. Active encouragement also requires that the company make time available since both employer and employee are assumed to benefit from the venture in which the individual already has a significant time investment.

The pressure to make companies "lean and mean" has led a number of major organizations to disband their human resources and training departments, which has further diluted corporate interest in continuing education. Attendance at technical and professional meetings, which is often the best way to gain new ideas through personal contacts, is being discouraged as a needless overhead expense. As a result of these tendencies, purveyors of continuing engineering education have seen a drop in overall attendance at continuing education courses over the last two years. There are, of course, many organizations, especially large high-tech companies, which have not fallen prey to these temptations. However, only after U.S.

companies once again adopt a broader point of view towards human resource management will continuing education and retraining become truly effective.

Government as Employer of Engineers

America's largest employer of engineers and scientists is the federal government. About one-sixth of the nation's engineers and scientists are employed by federal laboratories. Thousands of others are employed directly by government agencies or by industries which supply goods and services to the government. Further, the federal government funds about half of all research and development conducted in the United States.

Therefore, the federal government, directly and indirectly, has a powerful impact on employment of the nation's technical manpower. Federal policies have a major, but perhaps poorly understood, role in promoting the vitality and effectiveness of this manpower.

Recommendations

The above comments lead to a number of recommendations for public policy:

1. Life-long education should be recognized as a public good, no less deserving of public support than formal education. At a minimum, federal tax incentives for continuing education and retraining should be continued and strengthened.

Section 127 of the Internal Revenue Code, which exempts employer educational assistance, such as tuition reimbursement, from the taxable income of the recipient employee, is scheduled to expire on December 31, 1987. This provision, which was originally enacted in 1978 to provide an incentive for workers to improve and update their education, should be made a permanent part of the tax code. A related Code provision, Section 162, allows workers to deduct their own cost (not employer-paid) for courses. This section should be reviewed to widen its applicability and attractiveness to workers spending their own funds on continuing education and retraining. For example, this deduction is currently unavailable for educational pursuits leading to a new trade or business, i.e., retraining.

2. As the nation's largest employer of engineers and scientists, the federal government should more aggressively promote continuing education.

Consideration should be given to continuing education and retraining as a formal contingency in the programming and budgeting of large federal contracts. As a minimum, continuing education should be coupled to funding by technologically driven federal agencies. Such initiatives could also set the stage for new patterns in industry. The federal government should also take steps to coordinate its continuing education and retraining activities with those in the private sector. By assigning a high priority to continuing education for its own employees (and those of government contractors), the government would encourage wider CE activity in the private sector as well.

3. State and local educational authorities should be encouraged to upgrade math and science requirements for high school graduation.

Along with more extensive course requirements, a higher emphasis must be placed on providing necessary resources for recruiting qualified math and science teachers and for teaching aids such as laboratory equipment.

4. Government at all levels should continue efforts to encourage closer ties between academia and industry.

Although significant improvements have been made, particularly in research, much more needs to be done. Greater use should be made of the cooperative education method where students spend considerable time working in industry. Qualified professionals from industry should be actively encouraged to come to universities on partial or full teaching sabbaticals where their temporary absence from industry is not penalized and their expertise with current issues and problems can be more effectively woven into the educational process.

5. The federal government, along with private industry, should actively encourage the entry of more engineering baccalaureates into graduate work through appropriate fellowship, grants and forgivable loans.

Currently government programs are aimed primarily at doctorate studies. While this remains important, more attention must also be given to support for master's degree programs.

6. The current efforts of the National Science Foundation to encourage interdisciplinary studies and institutes should be enlarged, but not at the cost of other existing engineering research programs.

Inter-disciplinary initiatives are essential for effective education and research on complex modern technologies. These programs also provide an exposure to broader ideas and wider experiences than is normally possible within the departmental programs of a university.

7. The federal government should place a higher priority on support for updating and upgrading teaching and research equipment in American universities.

Government support should include both direct funding and stronger tax incentives for contributions of laboratory equipment by industry to universities. Modern equipment, including adequate computer facilities, is a prerequisite to improved engineering education.

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TECHNOLOGY AND EMPLOYMENT POLICY

by

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*The National Commission for Employment Policy (NCEP) is an independent Federal advisory agency, created in 1974 and presently authorized under the Job Training Partnership Act. It is mandated to advise the President and the Congress on national employment and training issues. Over the past several years the Commission studied how technological changes affect jobs, and made recommendations that are contained in its 1986 report, Computers in the Workplace: Selected Issues. While this paper relies on Commission recommendations and research results, all interpretations and conclusions are those of the author alone. Specifically, policy implications presented in this paper should not be regarded as the views of the Commission, individual Commissioners, or any other members of the Commission staff.

DIMENSIONS OF TECHNOLOGICAL CHANGE

In its request for a paper, the Technology Policy Task Force expressed particular interest in the circumstances facing workers and firms in the "traditional manufacturing industries." This paper takes a wider perspective, because of the author's belief that policy should address the ways in which technology is helping to change workplaces across the entire economy, making possible new industrial alignments. Such alignments include the incorporation of microprocessors into a variety of products and processes that change the way work is done, and the establishment of new communications networks that change where work is done.

Technological change is one kind of structural change in the economy. Structural changes are generally irreversible, in contrast to cyclical changes. A useful analogy is the distinction between changes in the climate and changes in the weather. Weather forecasts are concerned with cyclical phenomena to which people are accustomed to adapt--e.g., do I need to take an umbrella? Climatic changes require major, once-for-all kinds of adaptations, and not all of those affected by them will be capable of adapting. Similarly, firms, industries and nations whose characteristics are a good match for the new economic environment will do well, while those unable or unwilling to adapt will experience relative if not absolute decline in their fortunes. The difference between making policy for the economic world and the scientific view of how species adapt is that the current actors in the economy have more potential control over their own destiny when facing economic shifts than do current members of species confronted with environmental and climatic shifts.

New technologies and responses to them can only be implemented by human decisions. Human decisions are also central in the distribution of the benefits of change, including the economic growth made possible by greater productivity, and the improved quality of work life in safer and more pleasant surroundings. Some of these implementation decisions have imposed significant costs on the people least able to bear them, in the form of displacement, extended unemployment and reduced earnings prospects. Decisions that take human resource impacts into account could reduce these costs and redistribute them more in line with the distribution of the benefits of change.

A major problem for both analysts and policy makers is that technological change, and resultant labor market change, are anticipated very imperfectly. This is not so much a failure to develop better forecasting techniques as it is the very uncertainty that is inherent in the process of innovation. The ability of researchers to come up with new or improved processes or products is itself chancy. In addition, the extent to which innovations diffuse throughout the economy involves customer preferences and relative costs as well as the technological possibilities. As a consequence, older and newer technologies coexist in the market for considerable periods of time.

During such transition periods, there are several ways in which changes affect labor markets. First, there is displacement of some workers from jobs, and the consequent need for reemployment. Second, other workers are retrained to work with the new equipment, with effects on the career paths and wage structure within the firm. Third, in many cases, the organization needs to change if it is to take maximum advantage of the new capabilities.

These dimensions of change can be illustrated by the case of the "machine vision" industry. Machine vision is computerized image acquisition and analysis: examples include "eyes" for robots and quality control inspection of silicon chips. The industry supplies production equipment to other manufacturing industries. Its growth is evidenced by the increasing numbers of technologically-oriented workers machine vision firms employ, even in nontechnical jobs such as marketing. The proportion of skilled and semiskilled blue collar workers is much smaller than in traditional manufacturing industries.

In the customer industries, such as automobile manufacturing, demand for semiskilled workers is lower and skill requirements higher for those employees working with the new systems. There is little evidence of auto production workers who were displaced by the new technology moving into the machine vision industry, even when the new and old industries co-exist in the same region. There appears to be a need for "technology management" as a separate managerial skill, particularly in a swiftly-changing industry in which knowledge rapidly becomes obsolete.

(Kan Chen and Frank P. Stafford, "The Employment Effects of High-Technology: A Case Study of Machine Vision," NCEP Research Report 86-19, May 1986.)

Both the "high tech" and the user industry require people who are not just trained, but capable of being retrained as the technology evolves. An experienced assembly worker is fortunate if he or she is retained and retrained to work with the new equipment, since the probability of direct transfer to the new industry is low, and the number of jobs small relative to the numbers eliminated in industries such as automobiles. The on-the-job training provided the upgraded assembly worker will represent an addition to the bundle of skills needed for the occupation, but not a major transformation of his or her skills.

This situation is likely to characterize 95 percent or more of the workers using computers and computer-based equipment as part of their job duties. That is, adaptation to new technologies such as machine vision represents a relatively minor extension or modification of occupational skills for the vast majority of still-employed workers. However, the ability to adapt requires that a worker be functionally literate, at a minimum. Displacement strikes particularly hard at those who are functionally illiterate. Improvement in basic skills is needed throughout the workforce in order to be able to respond to job content changes as they diffuse throughout the economy.

(Harold Goldstein and Bryna Shore Fraser, "Preparing for Work in the Computer Age," NCEP Research Report 85-09, May 1985)

To say that technology is likely to have a relatively minor impact on the skills demanded of workers in most occupations is not to say that the occupational mix and staffing patterns used by firms will only vary marginally as new technolgy is introduced. Because of improvements in the ability to transfer information quickly, for instance, data entry operations and other "back office" tasks are being separated geographically from the location of the ultimate users in the upper echelons of the firm or from the customers. Airline reservations, stock transfers and legal abstracts are examples of operations that have been moved to areas of lower wages, including in some cases to locations overseas. The development of computer-controlled machine tools, to take another example, allows a worker to monitor more machines than could be operated by one person using the old technology. Here, diagnostic and trouble-shooting skills are needed when a machine goes down.

HISTORICAL PERSPECTIVES ON TECHNOLOGICAL CHANGE

Even revolutionary innovations take some time before they are widely adopted. Often, improvements and modifications are needed to make the product more suitable, e.g., there were several hundred patented modifications to the original Howe sewing machine. A period of "learning by using" is needed to discover many of the advantages of the new technology. Industry standards need to be developed, and buyers may wait until such standards are in place. In the development of electric power, for instance, over twenty years passed before the "battle of the currents" between Edison's direct current and Westinghouse's alternating current was resolved in favor of the latter.

Central innovations can spur a cluster of innovations in related fields, so that there are "ripple" effects throughout the economy, which take longer to diffuse. The structure of industries can also be affected. The telegraph improved communication, both reducing the monopoly power of local firms and helping make possible the development of nation- wide market power through the ability to coordinate widespread operations.

Improvements in the existing technology and reductions in its price can keep it competitive. Electricity did not provide the majority of power to manufacturing until after World War I, as steam engines continued to improve during the late 19th and early 20th centuries. In other cases, geographic and demographic factors impeded mobility for some workers employed in the industries affected by new technology. Adult male hand loom weavers who stayed in their rural areas, for instance, could not match the reduced prices of the urban mills using power looms, that primarily employed women and children at lower wage rates.

The net employment effects of these historic major technological changes were small. While fewer workers were needed to produce the former level of output, increased productivity and the consequent cost reduction allowed that output to be sold at lower prices. An increase in sales at these lower prices then increased industry demand for labor in a growing economy.

(John A. James, "Perspectives on Technological Change: Historical Studies of Four Major Innovations," NCEP Research Report 84-07, September 1984.)

There are clear echoes of these earlier effects in the current processes of innovation for computers and other new technologies. A major goal of improvements in technology applied to production processes is to lower costs and reduce demands for factors of production that are particularly costly. If cost reduction makes possible the sale of additional output at lower prices, the initial reduction in labor demand is at least partially offset.

Employment growth for the adopters of a new technology is likely to be greatest if the firm or nation is among the first to do so. Followers who adopt the new technology as a defensive tactic to avoid further erosion of their markets can never reap that initial advantage of both increased share of the original market and early capture of new sales.

New technology also generates new products that compete against established goods and services. (Trade acts as a "new product" technology by introducing competitors to domestic products.) Home video cameras for the U.S. market are competing against movie and still photography, for instance, and may have adverse impacts on jobs in photo labs and camera stores, as well as affecting markets for types of film and cameras manufactured in the U.S. versus those made abroad. Video rental stores build on the new product technology to compete against motion picture theaters.

IMPLEMENTING TECHNOLOGICAL CHANGE

Within an individual firm, implementation of new technologies has the three major implications already discussed: displacement of some employees, education and training for other employees, and, often overlooked, changes in how the firm functions. In the words of a National Academy of Sciences panel that studied this issue at the request of the Commission, "...a critical mass of interrelated changes is required in seven areas of human resource practices: planning; plant culture; plant organization; job design; compensation and appraisal; selection, training and education; and labor management relations."

(Committee on the Effective Implementation of Advanced Manufacturing Technology, Human Resource Practices for Implementing Advanced Manufacturing Technology, National Academy of Sciences, 1986, p.2)

The need for organizational changes that involve managers and unions as well as nonsupervisory employees is an example of the underappreciated role of human choice in implementing technological change. The technology of computer controlled machine tools, for instance, does not force firms to staff work stations with computer science graduates or with experienced machinists. The choice of whether to upgrade machinists by providing training in computers, or to bring in persons familiar with computers but unfamiliar with machining operations, or some combination, is a choice made by managers for reasons that are partly related to the technology, but that also include basic firm philosophies, union-management relations, expected productivity and cost differentials, and strategies for further automation.

The National Academy of Sciences committee found that effective implementation of computer-based technology for manufacturing implied the need for organizational policies that were also optimal from the point of view of responding to increased international competition and to the expectations of a better-educated work force. The characteristics of such organizations include:

o a highly-skilled, flexible, problem-solving, interacting, and committed work force;

- a flexible, humane, and innovative management organization with fewer levels and job classifications;
- a high retention rate of well-trained workers; and
- a strong partnership between management and labor unions—where unions represent the work force.

While these goals are relevant to all organizations, payoffs from pursuing them appear to be greater in those organizations on the frontier of technology implementation. Greater flexibility and problem-solving capacity are necessary because of a greater degree of interdependence in computer-based production. Employee discontent has a higher cost, in terms of damage and downtime, in such plants, hence the emphasis on fostering employee commitment and a humane management organization. Turnover is more costly in advanced-technology situations, because of the need to invest more in employees who can run unique operating systems. Where a union is involved there is the need to provide it a stake in a successful outcome, rather than to regard collective bargaining as a zero sum game between adversaries.

WORKER DISPLACEMENT

The other side of the coin of effective implementation in a growing market is represented by those firms and industries facing shrinking markets, or reducing overall demand for labor for any of a variety of reasons. For a more recent example than the historical ones discussed above, during 1979-84, primary iron and steel manufacturing experienced a 40 percent drop in employment, losing about 350 thousand jobs over the five year period, according to a Commission-sponsored analysis of the 79 "input-output" industries that account for about 87 percent of employment. This was the largest single industry employment loss during the period, which included the most severe recession since World War II. In the industries with lower employment in 1984 than in 1979, a total of 2.5 million jobs were lost, about an 11 percent reduction over the five years. This was more than offset by an

8.1 million job gain (about 13 percent of 1979 employment) for expanding industries, for a net employment gain of 5.6 million jobs.

(Charles Stone and Isabel Sawhill, "Labor Market Implications of the Growing Internationalization of the U.S. Economy," NCEP Research Report 86-20, June 1986.)

The estimate of 2.5 million jobs lost in shrinking industries from 1979 to 1984 can be compared to the estimated number of workers who reported being displaced during the January 1979-January 1984 period. That estimate, based on a Bureau of Labor Statistics special survey, is 10.9 million workers. This testifies to the "churning" that takes place in the labor market. The gross number of job losses in the whole economy is a multiple of the net reduction in those industries that actually had absolute declines in employment, because losses in particular firms, industries or regions are largely offset by gains elsewhere in the economy.

(Michael Podgursky and Paul Swaim, "Job Displacement, Reemployment and Earnings Loss:...," NCEP Research Report 86-18, Summer 1986.)

It might be thought that workers displaced from a growing industry would have greater reemployment prospects in that same industry or firm than would workers unemployed from industries experiencing decline. One recent study found the reverse: workers unemployed from a declining industry were more likely to be rehired by the same firm than workers whose unemployment started from a job in an industry that was expanding. Further, return rates were higher for women than for men, for older than for younger workers, and for the dominant (declining) industry in the three States studied than for other industries. A rationale for this counter-intuitive finding is that many jobs lost from declining industries, especially from the locally-dominant industries, are better than most available alternative jobs for these workers. Hence, they remain ready for recall when normal turnover generates job openings in firms that remain in operation even at lower levels of employment.

(Robert Crosslin, James Hanna and David Stevens, "The Permanence of

Dislocation: 1979-83 Evidence," NCEP Research Report 86-21, June 1986. The dominant industries and States were auto assembly in Missouri, steel in Pennsylvania, textiles in South Carolina.)

Crosslin, Hanna and Stevens also found that workers who did return to their former firms did not simply "wait out" an extended period of unemployment, but had shorter periods of initial unemployment than did workers who did not return to the former firm. That is, a typical pattern for such workers was securing an interim job or jobs before ultimately rejoining the initial employer. Those workers who did not return to their former firm or industry (about 15-20 percent of the sample) constitute the truly displaced. They also tended to have the longest duration of unemployment and least favorable earnings experiences on subsequent jobs.

Worker mobility and retraining, and structural adjustment generally, are the areas in which employment and training strategies are most needed for the truly displaced. Introduction of new processes and products via technological change is an important influence on the composition of demand for workers with different occupational characteristics. These demand shifts enhance the employment and earnings prospects of workers with certain attributes, while diminishing the prospects of others, particularly the functionally illiterate. The net change in level of national employment is likely to be small, however, assuming maintenance of the level of aggregate demand through macroeconomic policy. To the extent that displaced workers find it difficult to acquire the characteristics increasingly in demand, there is a potential for increased structural unemployment. It is this structural unemployment (and underemployment) that employment and training programs are meant to reduce.

POLICY IMPLICATIONS

Most nations realize that technological change needs to be effectively managed and cannot be effectively reversed, that is, it is a structural rather than a cyclical phenomenon. For an industry to be viable in world competition, it must not lag in the adoption of world class technology. While technological change is irreversible, it is proceeding in the United States economy at a rate which is managable, given intelligent and well-informed preparation. Aid to industries and individuals adjusting to new technologies and new market structures is an appropriate policy strategy for governments at all levels. Those aided, however, have the responsibility to make conscientious use of public and private resources to prepare themselves for the changing economic environment.

The most important response, for individuals, schools, firms and public agencies, is to recognize that basic skills are basic to the ability to adapt to change. Parents have the special responsibility of monitoring and helping the schools prepare their children for the changes to come, knowing only that they will come, but not their precise nature. Effective reading, writing and problem-solving skills are the prime requisites for successfully entering and staying in the economic mainstream. Firms consistently say when asked that they will provide specific skills if newly-hired workers arrive with basic skills and motivation.

Many firms provide substantial amounts of training and retraining to their employees in the course of implementing new technology. Such training and retraining is more prevalent in larger firms than in smaller firms. Smaller firms may tend to underinvest in such training, from a social point of view, because they feel more likely to lose the workers they have trained than do larger firms who have more internal mobility options. The major Federal aid to such firm-based training is through the tax code, which allows training costs to be deductible from income.

Federal programs that presently exist for displaced workers, such as the Job Training Partnership Act and Trade Adjustment Assistance, are needed and are set for substantial increases in the upcoming fiscal year. Programs that provide incentives for upgrading investments in continuing employees, complementary to firms' investment in new technologies, have yet to be developed at the Federal level, although several States have initiated programs. Focusing resources on small to medium-sized firms that are competing in international markets has been advocated in one recent paper.

(Donald Menzi, "TRAINING FOR WORLD-CLASS COMPETITION: Implications of New State-funded Training Programs for National Competitiveness Efforts," Regional Education Center for Economic Development, New York, March 1987 (manuscript).)

Changes in the labor market due to new technologies have their primary effects on redistribution of job opportunities among firms, industries, occupations, areas and demographic groups. Computerization, for instance, has provided more jobs for technical and professional workers and fewer jobs for semi-skilled production workers, and would have done so under whatever feasible macroeconomic scenario had been played out. The pressure of international competition means that leaders in the implementation of new technologies will be at an advantage compared to countries that lag behind, both in terms of protecting their own markets and winning more sales abroad.

In the United States, such technological leadership can be facilitated by a strong domestic economy that provides innovative firms an initial market and that lowers resistance to change if displaced workers have new jobs to which they can move. Progress toward full employment in the U.S. over the last four-plus years has been unevenly distributed geographically and demographically. Areas with tight labor markets still have labor force members, especially minority youth, who are not fully participating in the local economy, while those areas that have been adversely affected by structural change have severe underutilization of their human resources. Policies that increase the access of disadvantaged and displaced workers to good jobs reduce the potential for inflationary bottlenecks that can put full employment at risk. Policies that improve the functioning of the labor market in response to technological change also advance national equity and efficiency goals without sacrificing the dynamism and positive attitude to innovation that are major sources of our economic and political strength.

INDUSTRIAL TRANSITION: PUBLIC POLICIES FOR THE LABOR FORCE

BY
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Industrial Transition: Public Policies for the Labor Force

Changes in the global economy, import penetration, sluggish growth and echnological change all have taken a severe toll on jobs. Several developing nations are emerging as centers of production for a broad range of manufactured goods. Multinational firms, most of them with headquarters in the U.S., are relocating portions of their operations to nations with low labor costs. The consequences of these changes in the United States are unemployment, plant closings, an erosion of our manufacturing base and community disintegration.

In this paper I will discuss the nature and magnitude of the problems facing dislocated workers, the effect of these trends on the entire U.S. economy, the UAW's response to those problems, the inadequacy of current public policies and elements of an effective dislocated worker program. I want to make clear at the outset that while some analysts promote labor market policy as an alternative to trade and industrial policy,[1] I consider labor market policies to be a necessary adjunct to managed trade and industrial policy not a substitute for such policies.

Why Manufacturing Matters

There are some who argue that plant closings and the erosion of U.S. manufacturing is not cause for concern. For example, Workforce 2000, a study commissioned by the U.S. Department of Labor states:

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[1] For example see Malcolm Lovell, An Antidote for Protectionism, The Brookings Review, Fall 1984.

Robert Z. Lawrence and Robert E. Litan, Saving Free Trade: A Pragmatic Approach, The Brookings Institution, Washington, D.C., 1986.

Gary Clyde Hufbauer and Howard F. Rosen, Trade Policy For Troubled Industries, Institute for International Economic, Washington, D.C., March 1986.

> "Economic development follows a predictable pattern in which agriculture production shifts to manufacturing and then to services . . . The shift to services . . . is a reliable barometer of the stage of industrial advancement that a country has achieved . . . (T)he movement of plants overseas is not so much threatening as it is irrelevant."[2]

This disturbing perspective neglects the fact that a strong manufacturing sector provides the base for many better paying jobs -- in related services, construction and the public sector -- throughout the American economy. These jobs have enabled millions of Americans to achieve a middle class standard of living. The erosion of our manufacturing base has jeopardized that standard of living. Stephen Cohen and John Zysman explain why manufacturing matters:

> "If we lose control and mastery of manufacturing production it is not simply that we will not be able to replace the jobs lost in industry by service jobs; nor simply that those service jobs will pay less; nor that the scale and speed of adjustment will shock the society -- and the polity -- in potentially dangerous ways . . . It is that if we lose mastery and control of manufacturing, the high-paying service jobs that are directly linked to manufacturing will, in a few short rounds of product and process innovation, seem to wither away (only to sprout up offshore, where the manufacturing went). In the final analysis this is the core of the manufacturing matters argument . . . It is the high-value-added service roles tied directly to manufacturing that we must hold and develop if we are to remain a powerful economy. It is not manufacturing jobs per se. **In brief, in order for the shift of employment to services to be developmental and not become a shift to poverty, we must maintain mastery and control of manufacturing production.**"[3]

Cohen and Zysman estimate that 40 to 60 million Americans, many of whom are conventionally counted as service workers depend directly upon manufacturing production. Thus we not only need policies to facilitate the adjustment process for

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2. William Johnston, Workforce 2000, The Hudson Institute, Indianapolis, 1987, p. 20, 28.

3. Stephen Cohen and John Zysman, Manufacturing Matters, Basic Books, New York, 1987, p. 20-21.

workers who lose jobs, but we also need policies to preserve jobs and maintain a strong industrial economy.

Impact on UAW Members Has Been Devastating

General Motors' widely publicized decision to close numerous plants employing many thousands of workers (the ripple effect will result in thousands of additional jobs lost) is only the most visible example of what is happening to thousands of UAW members in auto, agricultural implement, construction machinery, the parts supplier industry, and millions of other workers throughout our economy.

The hardship faced by workers who lose their jobs was documented by a study of unemployed Michigan auto workers conducted by the Social Welfare Research Institute of Boston College.[4] More than 100,000 Michigan auto workers experienced permanent or indefinite layoffs between 1979 and 1982. By the summer of 1984, 30 percent of those surveyed had not been recalled. Among those still on layoff, more than half were unemployed or working part time.

The drop in income was drastic. By the last month of layoff, average weekly income for an individual fell 61 percent. Workers not only experienced a major decline in income, but also were forced to use up their life savings. Among those who had any savings, more than 40 percent used them up entirely while unemployed.

To make matters even worse, at a time when health insurance coverage was desperately needed, coverage was lost. Almost one-third of the auto workers surveyed had no health insurance coverage whatsoever at some time during their layoff. Some workers and their families did not seek needed medical care because they could not afford it.

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[4] Barry Bluestone, Avery Gordon, Paul Schervish, The Unemployment and Reemployment Experiences of Michigan Auto Workers, Social Welfare Research Institute, Boston College, 1983.

As for those who managed to find another job, 65 percent were in non-union jobs. Their wages were on average 19 percent below their previous wage level and fringe benefits had been dramatically reduced. Only 63 percent of those reemployed were receiving health insurance.

Dislocated Workers

The most extensive government study to date, undertaken by the Bureau of Labor Statistics, showed that each year over 1.5 million workers lost their jobs in plant closings or permanent layoffs.[5] No region, industry, or sector of the workforce has been spared. Contrary to popular misconception, the problems of economic dislocation are not confined to northern industrial states. In fact, from 1981 to 1986, the region with the highest rate of dislocation was the South in the area encompassing Kentucky, Tennessee, Alabama, Texas and Oklahoma (see Table 1).

Nearly half of dislocated blue-collar workers were jobless more than half a year, with one in five experiencing more than two years without work. Displaced black workers are unemployed twice as long as other displaced workers.

Besides the financial burden of lengthy unemployment, most displaced workers are forced to take jobs at lower pay and often are only able to find part-time work. Blue-collar workers, both male and female, earn 16 percent less in their new jobs. Nearly one-third took pay cuts of more than 25 percent. Those forced into new occupations or industries took pay cuts of 25 to 30 percent. Older workers, minorities and those less educated are especially hard hit.

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[5] Paul Flaim and Ellen Sehgal, Displaced Workers 1979-1983, Bureau of Labor Statistics Bulletin #2240, July 1985, Washington, D.C.

Francis W. Horvath, "The Pulse of Economic Change: Displaced Workers of 1981-1985," Monthly Labor Review, June 1987.

Mike Podgursky and Paul Swaim, Labor Market Adjustment and Job Displacement: Evidence from the January 1984 Displaced Workers Survey, Bureau of International Labor Affairs, U.S. Department of Labor, January 1986, Washington, D.C.

Everyone is Affected

Between 1947 and 1973 real median family income in the U.S., after adjusting for inflation, increased by approximately 100 percent. Since 1974, however, the trend has not only stopped increasing, but has become negative. In 1986 median family income is almost $300 less than in 1973.

The decline in real income for most American families in the last decade is especially disturbing in light of the growth of two-earner families during the same period. While more people in each family are working, the family is worse off than before.

These trends toward income stagnation are especially hard on the young. It is becoming increasingly difficult for young workers to pursue the American dream: a home, financial security, and education for their children. In 1973, 30-year-old workers had to devote 21 percent of their monthly gross pay to the mortgage payments on an average new home. But with lower real earnings and higher interest rates in recent years, equivalent workers in 1984 had to pay an incredible 44 percent of their monthly income to the same type of home.[6] Therefore a traumatic reversal of historic experience may be in order for today's young; they may have lower economic status than their parents.

Deindustrialization Leads to Low Wage Jobs

An important factor in the decline of family income is the erosion of manufacturing industries (see Table 2). Between 1979 and 1986, about 11 million new jobs were added to the American economy. All of the job growth took place in service-producing industries. During this same period, we lost over 2 million production worker jobs in manufacturing.

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[6] Frank Levy and Richard Michel, "The Baby Boom Bust," Challenge, March/April 1986, p. 37.

An industrial economy employs large numbers of relatively well-paid production workers. A service economy, however, employs legions of keypunchers, sales clerks, waiters, secretaries, and cashiers, and the wages for these jobs tend to be comparatively low. In 1986, the average weekly wage in manufacturing (which makes up the bulk of the goods-producing sector) was $396.01. In the service sector (hotels, restaurants, health care, etc.), average weekly earnings were $262.20 and in retail $175.78 (these industries comprise over half of the service-producing sector). It is important to note that in 1986 the yearly average in retail trade was substantially under the poverty line for a family of four (for a family of four the poverty line is $11,200).

Numerous studies have documented an increase in the number of low-wage jobs being created in the U.S. economy. Barry Bluestone and Bennett Harrison have shown that between 1979 and 1985 44 percent of the net new jobs created paid low wages (less than $7,400/year measured in 1986 dollars).[7] This was more than twice the rate of low wage job creation that prevailed during the 1960s and 1970s. And while millions of new high-wage (more than $29,000/year) professional, technical and managerial jobs were created during the 1980s, their growth was only a third the pace of high wage job creation between 1963 and 1979.

According to an analysis by the Industrial Union Department (AFL-CIO) between 1979 and 1985 industries in which there was a net job loss paid average wages of $402 a week, while industries in which there was a net job gain paid average wages of $258 a week. In other words, we are losing jobs in industries that pay 56 percent or $144 a week more than the industries in which jobs are being gained.[8]

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[7] Barry Bluestone and Bennet Harrison, "The Grim Truth About the Job 'Miracle'," New York Times, February 1, 1987.

[8] See Larry Mishel, "The Jobs Controversy," forthcoming Monthly Labor Review.

For millions of workers who hope to achieve financial security, for millions of parents who hope their children can move up the economic ladder, for American business which needs a strong middle class to consume its products, and for everyone who is concerned about fairness these are ominous developments.

Few Workers Receive Advance Notice or Adjustment Assistance

Twenty years ago no less an authority than former Secretary of Labor George Shultz stated "there should be at least six months and preferably a year advance notice" of plant closings.[9] The recent Pastoral Letter issued by the U.S. Conference of Catholic Bishops, entitled Catholic Social Teaching and the U.S. Economy, states:

> "When companies are considering plant closures or the movement of capital, it is patently unjust to deny workers any role in shaping the outcome of these difficult choices . . . The capital at the disposal of management is in part the product of the labor of those sho have toiled in the company over the years, including currently employed workers. At a minimum, workers have a right to be informed in advance when such decisions are under consideration, a right to negotiate with management about possible alternatives, and a right to fair compensation and assistance with retraining and relocation expenses should these be necessary."[10]

Nor is it only labor leaders or religious leaders who offer arguments in support of advance notice. The report of the Secretary of Labor's Task Force on Economic Adjustment and Dislocation stresses that "advance notification is an essential component of a successful adjustment program."[11] Recent reports by business organizations such as the Conference Board and the Committee for Economic Development also point out the importance of advance notice.[12]

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[9] George Shultz and Arnold Weber, Strategies for the Displaced Worker, Harper & Row, New York, 1966, p. 191.

[10] Economic Justice For All: Pastoral Letter on Catholic Social Teaching and the U.S. Economy, National Conference of Catholic Bishops, Washington, D.C., 1986, p. 150-151.

[11] Economic Adjustment and Worker Dislocation in a Competitive Society, Report of the Secretary of Labor's Task Force on Economic Adjustment and Worker Dislocation, Washington, D.C., 1986, p. 221.

Despite widespread agreement on the importance of advance notice, very few workers receive adequate notice before they lose their jobs. According to a comprehensive survey by the General Accounting Office (GAO), less than one in ten blue-collar workers receive more than 90 days notice of a plant closing or mass layoff. The GAO survey found that 30 percent of employers gave no individual notice to blue-collar workers and another 34 percent gave two weeks or less. White-collar workers get an average of two weeks notice while blue-collar workers receive an average of only seven days. Blue-collar workers in non-union establishments receive an average of two days advance notice.

The GAO study also shows that very few workers receive placement or financial assistance after they lose a job. Only one in three blue-collar workers receive severance pay or extension of health insurance. Only one in five blue-collar workers is offered job search assistance and only one in ten a transfer option or careeer counseling (see Tables 3 and 4).[13]

Government Has Not Responded to the Problem

The federal government has a responsibility to provide a safety net of social benefits to American workers who lose their jobs.

It is most unfortunate that at a time when the need is greatest, the Reagan Administration has drastically reduced the federal commitment to employment and training. From 1978 to 1986, federal expenditures (in constant dollars) for training and employment dropped 68 percent. During this same period the number of unemployed increased from 6.2 million in 1978 to 10.7 million in 1983 and back down to 8.3 million in November 1986. To understand the actual impact of the budget cuts on the ability to provide employment and training opportunities, it is necessary to consider the resources available per unemployed person. In 1978 the federal budget provided almost $1,269 per unemployed person for employment and training. By 1983, this amount had fallen to $262. This represents a 79 percent decline in resources per person! According to several estimates, the level of federal financing today can serve only 4-5 percent of Americans in need of job training.[14]

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[12] Secretary Ronald Berenbeim, Company Programs to Ease the Impact of Shutdown, The Conference Board, New York, New York, 1986, p. 7.

Work and Change: Labor Market Adjustment Policies in a Competitive World, Committee for Economic Development, December 1986, p. 44-45.

[13] Dislocated Workers: Extent of Business Closures, Layoffs, and the Public and Private Response, U.S. General Accounting Office, Washington, D.C., 1986.

Along with a reduced commitment, the Job Training Partnership Act (JTPA) has shifted responsibility for training away from the federal government to the states. In addition, funds cannot be used for job creation purposes and the payment of stipends to trainees is seriously restricted.

The vulnerability of workers who lose their job is increased by cutbacks in the unemployment insurance system. Once a program to assist most of the unemployed, unemployment insurance now assists only a small fraction of jobless workers and the level of assistance is inadequate (see Table 5). As a result, a job loss entails a greater risk of substantial income loss, as well as a brush with poverty.

Nearly two of every three jobless workers are now without benefits, even without counting discouraged workers. (Discouraged workers are those who have given up looking for a job and are not counted as officially unemployed; if they are included, the percentage of jobless workers getting benefits falls closer to 20 percent.)

The Trade Adjustment Assistance program (TAA) is designed to help workers who are victims of U.S. trade policy. In 1980, before Reagan took office, over one-half million workers were certified to receive TAA. After Reagan sought and achieved a cut in the program in 1981, the number of workers certified plummetted to under 28,000. While the trade deficit has reached record levels, the number of workers certified for TAA is still only one-tenth what it was in 1980 (see Table 6).

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[14] Technology and Structural Unemployment: Reemploying Displaced Adults, U.S. Congress, Office of Technology Assessment, Washington, D.C., 1986, p. 163, 165.

Lack of National Policy Has Put Burden on Collective Bargaining

In the absence of a responsible public policy, much of the burden for dealing with plant closings and permanent job loss has fallen to the labor movement. In the case of plant closings with major employers, the UAW has been able to mitigate somewhat the consequences by negotiating a variety of important job and income security provisions. At some major companies we've been able to negotiate joint union-company training programs to help dislocated workers qualify for and find new jobs.

While these programs provide services for active and laid-off workers, I will focus here on programs designed to assist dislocated workers.

Under the UAW-Ford program the initial step taken was to establish a jointly directed National Development and Training Center. The Center plans, designs, and coordinates programs -- relying primarily on existing community educational and counseling resources.

A number of elements make up the program for dislocated workers. The first consists of career day conferences which provide laid-off workers the opportunity to learn of what is available under the total program and through the community. Usually in conjunction with a career day conference, vocational plans and interest surveys are conducted which assist workers in self-evaluation and exploration of career alternatives. Another element in the self-evaluation process is the career counseling and guidance program which assists workers by helping formulate specific career goals and plans to achieve them. From 1984 through 1986 over 7,500 laid-off employees participated in the guidance and couseling program.

A prepaid tuition assistance plan pays tuition costs and compulsory fees up to $5,000 in any 4 year period for qualifying laid-off workers so that they can pursue self-chosen education and training to improve their chances for reemployment within or outside the company. From 1984 to 1986 over 9,000 workers enrolled in this program.

Another retraining strategy involves targeted Vocational Retraining Projects, or TVRs. Targeted Vocational Retraining is intensive, full-time retraining -- generally technical in nature -- which will lead to skill certifications in specific occupations. Projects are established only where there are definite job prospects, and quality educational institutions and vocational training programs are available. Once training is completed, workers receive job placement assistance. From 1984 to 1986 over 1,500 laid-off workers enrolled in this program.

Because some workers may only need or want job search assistance, job skills workshops are established. These workshops provide labor market information, development of job-seeking support systems, and help with resume writing and interviewing skills. From 1984 through 1986, special job search skills workshops were attended by over 3,400 unemployed workers.

As indicated earlier, in addition to assistance for dislocated workers, there are new education and training programs for active UAW-represented Ford workers. These programs range from prepaid tuition assistance for formal education and training to special targeted education and training projects.

The joint UAW-GM program is also committed to providing dislocated UAW-represented workers all the support and assistance they need to find and keep new jobs either within or outside GM.

Under that commitment a national tuition assistance plan for dislocated workers has been established. Eligible laid-off workers can receive up-front payment of up to $5,000 to attend an accredited college, university, or certified vocational school. This plan provides for "up-front" money and requires only that courses selected be taken at accredited or licensed schools. Courses need not be related to previous

GM employment. This plan is designed to help laid-off workers improve their chances of reemployment either within GM or with some other employer. Since 1984 over 19,000 workers have participated.

All dislocated workers are encouraged to enroll in regional centers through outreach efforts conducted by the UAW and management. As a result of on-going job development activity by the area centers and national office, the UAW-GM program offers on the job training (OJT) to the majority (approximately 70 percent) of displaced workers. The UAW-GM Training Center enters into contracts with employers in which the UAW-GM program provides OJT training subsidies of up to 50 percent of wages for an agreed upon period of time in exchange for a job placement.

Other workers are guided into self directed job search workshop activity in which they learn resume writing, interviewing, and networking skills, and are encouraged to seek employment by counselors and their peers in the workshop.

Still others are encouraged to enhance basic skills and/or job skills based upon remediation needs identified through individual assessments. Contracts for basic skill and job skill training are normally executed with local public/private educational institutions. When contracting for job skill training, the UAW-GM program favors performance based contracts that feature intensive, short-duration classroom training (CRT) offering a viable job placement.

UAW efforts to negotiate training programs have not been limited to the auto companies.[15] We also have established programs with companies in the agricultural implement industry where our members have also been hard hit by layoffs in recent years.

At International Harvester (now Navistar), for example, in addition to negotiating tuition refund for laid-off workers, the UAW negotiated an outplacement assistance program. A variety of job search services were provided, including training in writing resumes, information on job opportunities, as well as information on available support services within the community. One of the most successful adjustment efforts was the UAW-IH Farmall Outplacement Center. The project was a bi-state effort by Illinois and Iowa. Over 88 percent of the 3,800 workers who participated in the center's programs were placed in jobs.

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[15] The UAW established training programs with Ford and General Motors in 1982. In 1985 the UAW also negotiated a joint training program at Chrysler.

The UAW's experience with the negotiated programs has been positive. Laid-off members are receiving training and other services which have or will help them regain employment. Programs underway for active members are enhancing their current employability or qualifications for job upgrading. Moreover, these programs have had the important byproduct of providing a forum in which to exchange ideas with management on how to develop better and more advanced ways to satisfy our members' training needs.

The UAW intends to build on these accomplishments at the bargaining table but the problem of worker displacement cannot be solved solely through union/company initiatives. While we have been successful in providing training and job search assistance to thousands, hundreds of thousands need such help. Reaching all of the workers who need training requires a strong commitment and decisive action by the federal government.

Elements of An Effective Dislocated Worker Program

While the following by no means represents the detailed workings of a plan for a displaced worker employment and training program, it is a blueprint of what we consider to be key elements for an effective program:

- Targeted Employment Creation -- The focus of any displaced worker program is training and readjustment assistance. However, no amount of training and job search assistance will help if jobs do not exist. To link training and employment, planning agencies (comprised of labor, community and business representatives) at all levels of government should compile an "assessment of unmet needs" in such areas as health, education, roads, bridges, water treatment, sewage, housing, high-speed trains, and environment resources. These planning agencies would create a "shelf" of desirable products, planned in advance, which could provide useful work when recession makes full employment attainable only through countercyclical policy. Whenever the unemployment rate exceeds 4 percent in a local area, the federal government should make funds available to local governments to finance guaranteed public employment (and the necessary training programs required for that employment) for anyone who needs work. In designing the program of public service jobs, adequate safeguards are needed to protect the employment security and standards of current public sector workers.

- Reduced Work Time -- While an increasing number of Americans lack work, the hours of work for the employed have not decreased substantially since the late 1940s. In that same period, however, the productivity of production workers has increased 100 percent, while real average gross weekly wages increased by only 36 percent. One way to share equitably in the fruits of improved productivity would be to reduce working time without loss of pay. In 1985 weekly working hours in the U.S. auto industry exceeded that of auto workers in most other industrial countries (see Table 7). Shortening the workweek is a humane end in itself and a strategy for enhancing productivity and maintaining full employment.
- Advance Notice of Plant Closings -- When a plant is about to close or a permanent layoff take place adequate lead time is essential if appropriate programs to assist affected workers are to be successfully developed and implemented. Yet, the U.S. is virtually alone among the major industrialized countries in not requiring advance notice of major plant shutdown or permanent layoff.
- Labor Market Information -- In order to develop activities which will enable dislocated workers to secure good, long-term jobs, accurate information about current and future labor market conditions is needed.

- Federal Program with Adequate Funds -- Any program can only be truly effective and equitable, and be assured of reaching its objective -- to provide meaningful training, job search assistance, and other services which will lead to good long-term job opportunities -- if it is a federal program. Once the need for such assistance is tully and properly evaluated funds necessary to meet that need must be committed.
- Flexible and Comprehensive Assistance -- The overall effort must be flexible so that programs can be tailored to the specific needs of the dislocated. A full compliment of programs should be available. This would include the types of services currently provided under our negotiated joint UAW-Ford, GM and Chrysler programs which range from career counseling and skills assessment to specially created retraining programs (see pages 7-10 of this statement for more detail). In addition, there should be income and social services support as outlined below.
- Income Maintenance -- Adequate stipends for those enrolled in training programs are necessary; without them many workers would lack the financial resources to support themselves and families while in training. At a minimum, workers should be entitled to receive unemployment insurance benefits along with training benefits.
- Medical and Life Insurance -- Higher rates of unemployment are associated with drastic increases in stress-related illness. Yet, at a time when many workers have a rising need for health protection, they have lost their health insurance as well. In most cases they also lose life insurance protection. These protections should be provided.
- Other Financial Assistance -- There are other financial problems associated with job loss as mortgage and rent difficulties. Help with such problems should be available.

- Crisis Intervention -- Since unemployment is a profoundly traumatic experience, availability of coordinated crisis intervention and counseling service often is a pre-condition for success of other forms of assistance.
- Relocation -- Relocation to another area may be a viable alternative for some of the dislocated. In those cases, workers should be provided assistance with moving-related costs including pre-move visit and expenses associated with selling and buying a new home or terminating a lease and renting another apartment.
- Union Involvement -- If programs are to meet workers' needs, labor participation is a necessity. As stated previously, because of their vast experience with assisting workers and helping to resolve worker problems, labor unions are in a unique position to provide meaningful input in training and related programs.
- Labor Standards -- There must be standards to protect workers' interests and prevent employer abuse. Guarantees regarding wages, benefits, working conditions, and protections against displacement of regular workers are necessary to assure equity for those participating in the programs, and to protect incumbent workers.
- Performance Standards -- A system of reporting and performance standards needed to determine which training approaches work best. This information will make it possible to assess the broader policy implications of employment and training programs' future policy directions. Development of performance standards should be sensitive to, and realistic about, differing economic conditions within areas of the country. Moreover, they should not be constructed so as to encourage providing help to only those workers who are the closest to being "job ready" and not to workers whose needs may be greater or more complex.

Conclusion

The fundamental requirement for the success of any training program is employment growth. To assure steady economic growth and full employment we need a full employment macro policy coupled with an industrial policy. That industrial policy would include a system of national planning to manage our resources in a manner that best serves the economy's needs, a comprehensive labor market policy, a trade policy that will reduce our massive trade deficit, and a tax policy combining fairness, targeted economic growth incentives and adequate revenues.[16] All of these policies should aim at maintaining a strong industrial base -- a necessity to preserve our standard of living.

The U.S. economy is beset with serious problems requiring innovative public policy. Six years of the Reagan Presidency have shown that laissez faire is not adequate in today's economy. It is encouraging that the conservative political reaction appears to have run its course and alternative public policies once again are being debated. I offer the labor market program set forth in this paper as a contribution to that debate.

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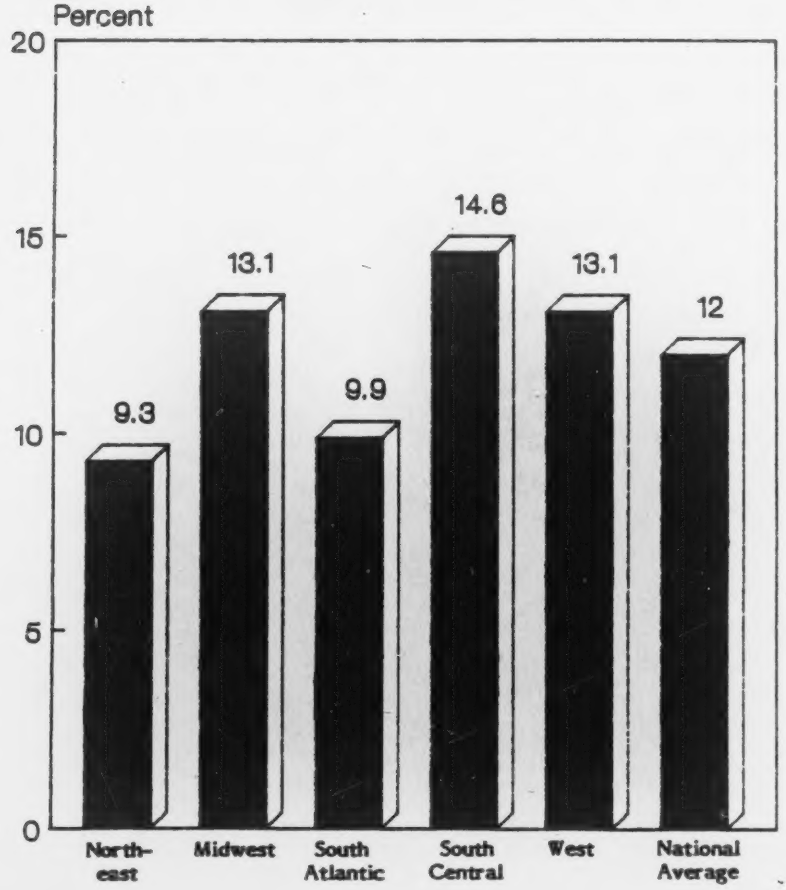
[16] The UAW's statement on industrial policy is detailed in: Building America's Future, International Union, UAW, Detroit, Michigan, 1986.

Table I

Rates of Dislocation by Region*
1981-1985



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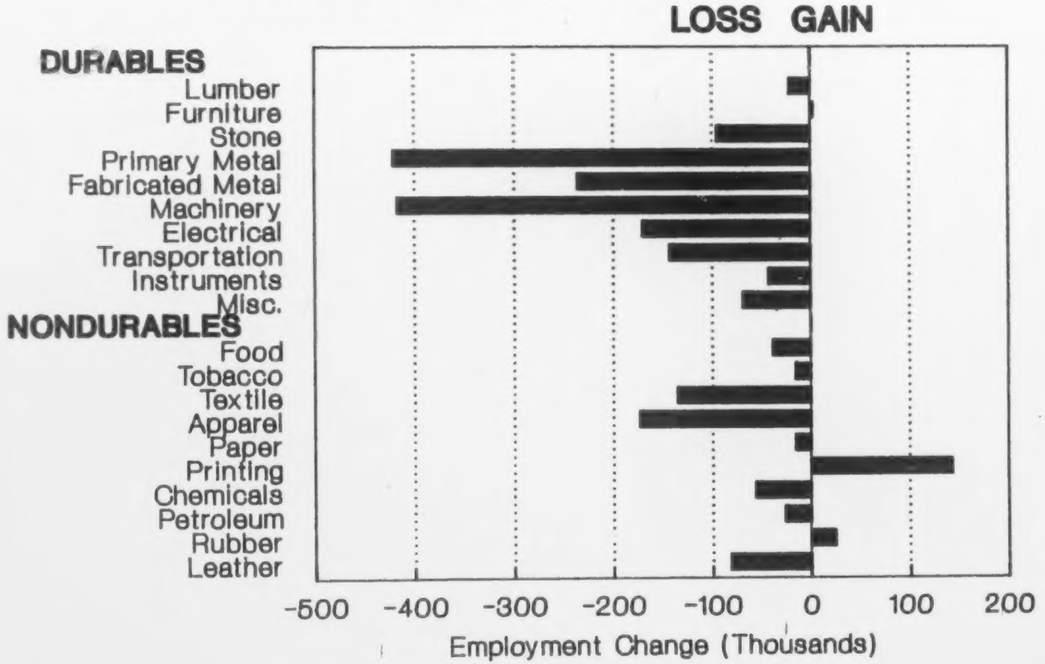
* The rate of dislocation represents the percentage of full-time workers displaced between 1981-1985.

SOURCE: Bureau of Labor Statistics

Table 2

MANUFACTURING EMPLOYMENT CHANGE
From 1979 to June 1987

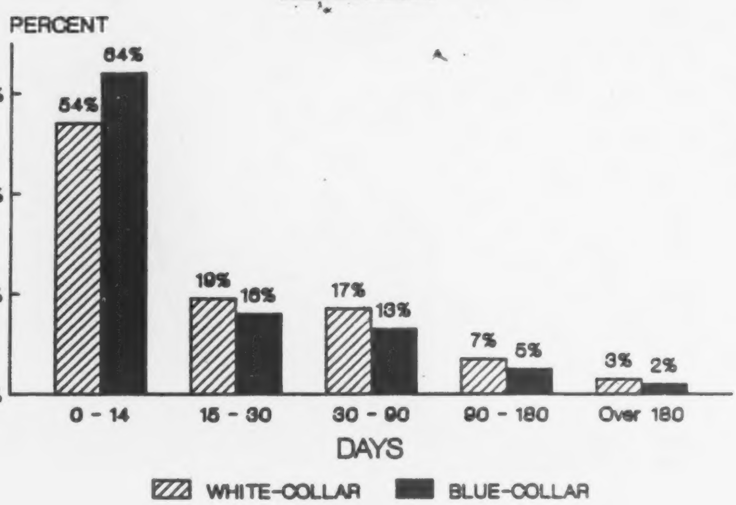


Prepared by U.A.W. Research Department

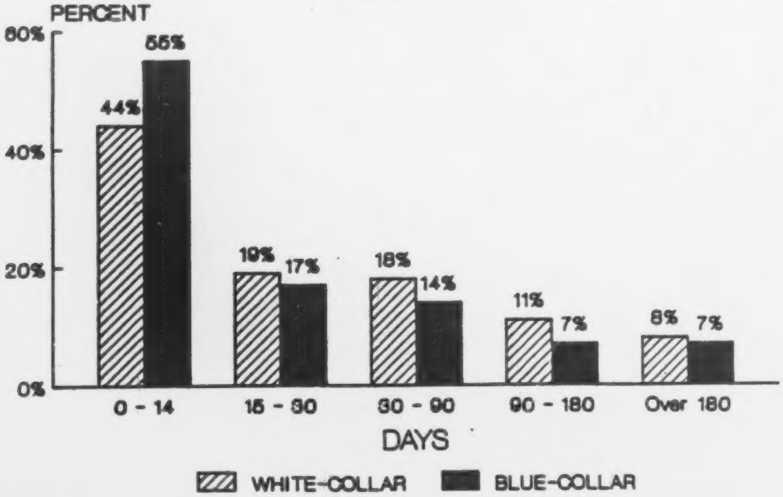
Table 3

PERCENT OF ESTABLISHMENTS PROVIDING ADVANCE NOTICE*

Specific Notice



General Notice



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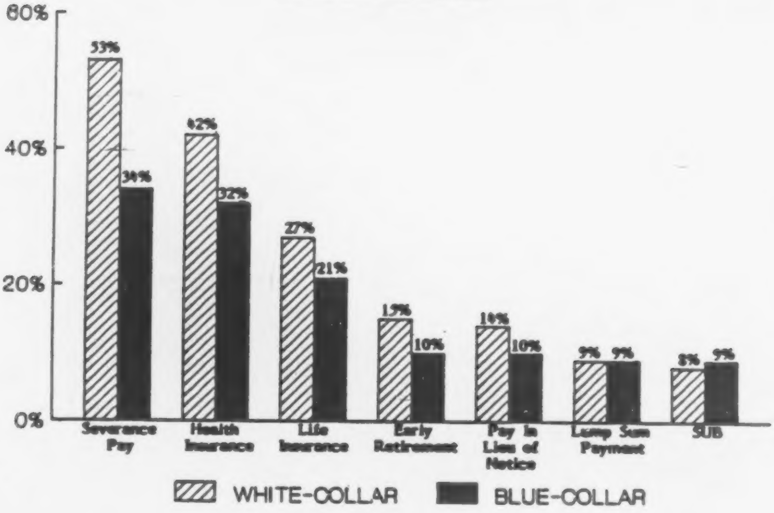
* The GAO study defined two kinds of advance notice — general and specific. General advance notice is intended to provide workers and the community with advanced warning but does not specify the exact date or the particular workers to be affected. A specific notice, on the other hand, informs workers that their employment will be terminated on a specific date.

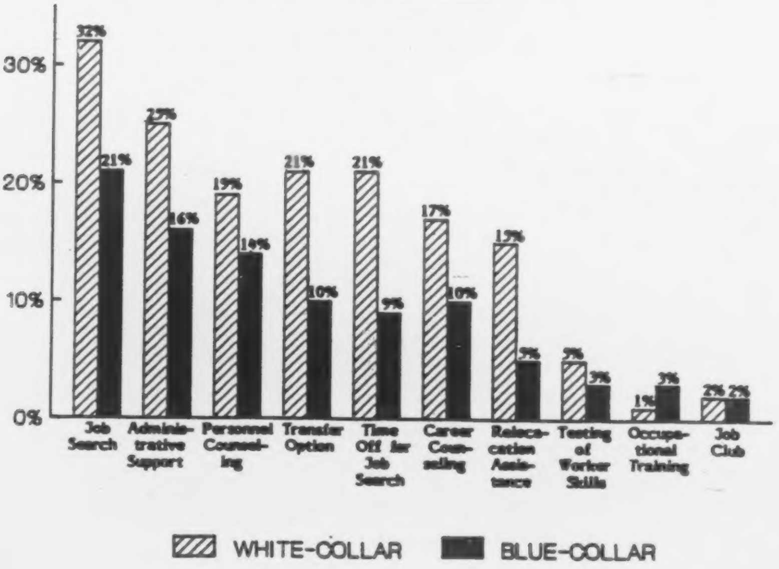
Table 4

PERCENT OF ESTABLISHMENTS OFFERING FINANCIAL AND PLACEMENT ASSISTANCE

Financial Assistance



Placement Assistance



SOURCE: General Accounting Office.

Table 5

Percentage of the Unemployed Receiving Unemployment Insurance

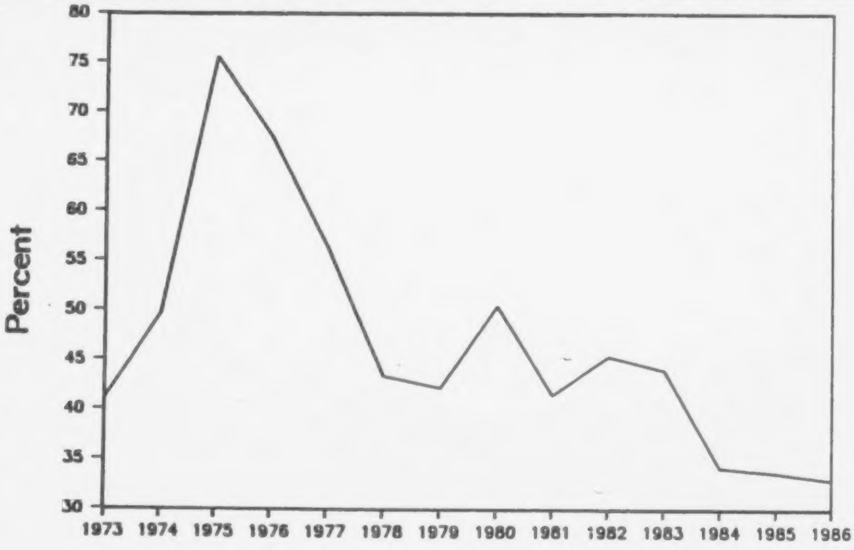


Table 6

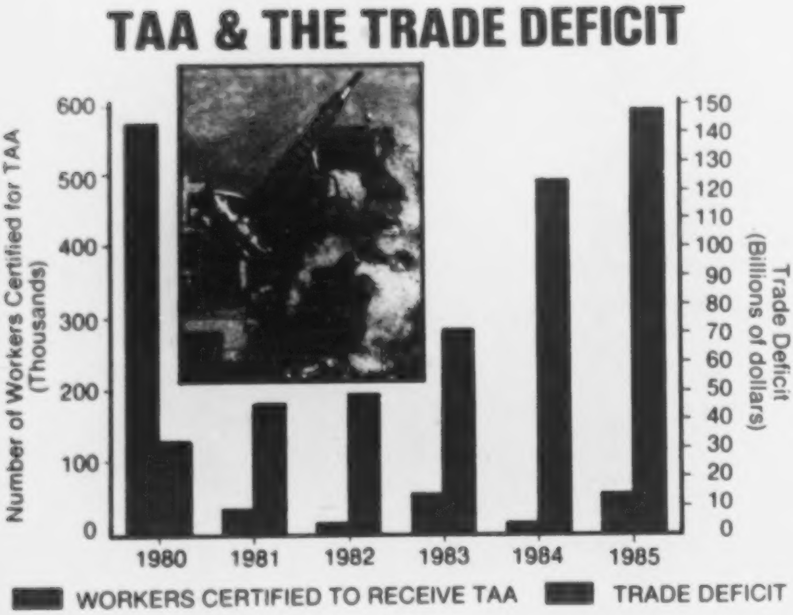
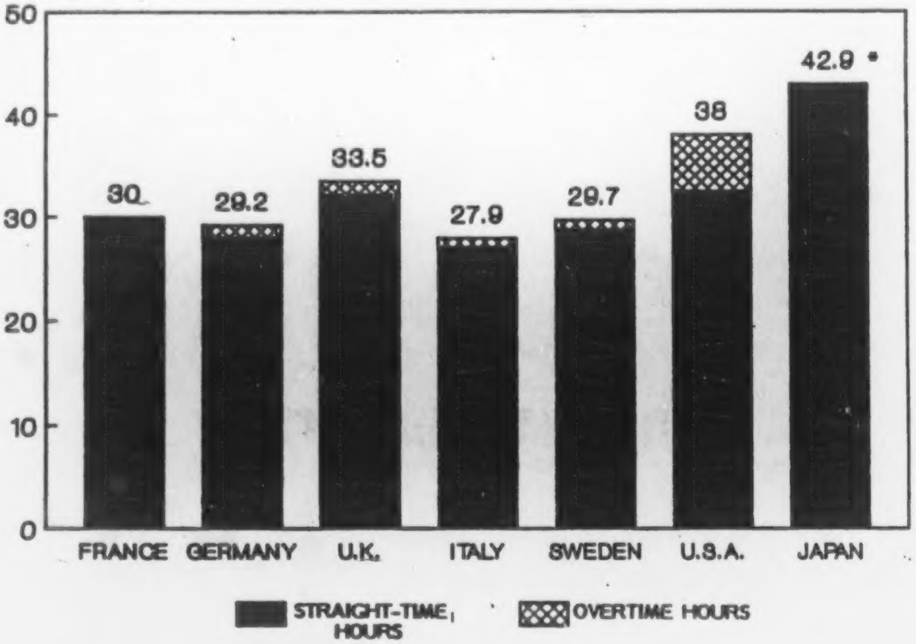

TAA & THE TRADE DEFICIT
Number of Workers Certified for TAA (Thousands)
600
500
400
300
200
100
0
1980
1981
1982
1983
1984
1985
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Trade Deficit (Billions of dollars)
WORKERS CERTIFIED TO RECEIVE TAA
TRADE DEFICIT

Table 7

WEEKLY WORKING HOURS - AUTO INDUSTRY
AN INTERNATIONAL SURVEY

1985



* No breakdown of overtime hours is available for Japan.

SOURCE: German Association of Motor Vehicle Manufacturers

Statement by

Dennis Chamot, Ph.D.
Associate Director
Department for Professional Employees, AFL-CIO

Submitted to the

Technology Policy Task Force
Committee on Science, Space and Technology
U.S. House of Representatives

August 28, 1987

Technological changes do not occur in a vacuum. While it is often very difficult to isolate the effects of new technologies in the presence of massive trade imbalances brought about by an over valued dollar, or during a transition to a new industrial structure for the American economy, all of these subjects are interrelated. The specific ways that technologies develop and get applied have profound effects on employment, quality of work life, and international competitiveness.

It is important to note that new technologies can lead to either new products or new processes. In the former case, the results may be quite positive - creation of jobs, expansion of exports, and stimulation of additional support services. The more common situation by far, however, is the application of new techniques, materials or machinery to existing products, with the goal of reducing costs and increasing productivity. In such cases, reduction of labor costs is often a major goal, and in the absence of greatly expanded output, this leads to lost employment opportunities.

The committee is familiar with the long term trends which produced an employment shift from a predominantly agricultural economy, to one where manufacturing offered many new jobs, to the present day where most job growth occurs in services. These massive structural changes were caused in part, and certainly facilitated by, technological changes. Agricultural employment dropped from about 40% at the turn of the century to about 3% today precisely because continuing innovations expanded enormously the productivity of American farms. The excess labor simply was no longer needed. However, not so obvious is the fact that innovations occurring elsewhere in the system have also reduced labor demand in *all* food related activities. As Table 1 shows, there has been only slight growth in total employment in this broad area since 1900, while the nation's population *tripled*. This is a direct result of technological improvements, not only better seeds, fertilizers, and powerful farm machines, but also electrification, improvements in transportation and communications, changes in food packaging and preparation, and the application of computers throughout the industry (to name but

TABLE 1. EMPLOYMENT IN FOOD RELATED INDUSTRIES

	1900		1982	
Total U.S. Population	76,000,000		231,500,000	
	No. (Mill.)	% of Workforce	No. (Mill.)	% of Workforce
Farm workers	10.9	14.3	2.7	1.2
Nonfarm food related employees				
Food processing	0.1		1.6	
Food wholesaling	0.3		0.8	
Food retailing	0.4		2.5	
Eating and drinking establ.	0.1		4.8	
Total nonfarm food related	0.9	1.2	9.7	4.2
Support activities (farm equipment, fertilizer, hauling, and delivery)	0.2	0.3	0.9	0.4
Total food related workforce	12.0	15.8	13.3	5.8

Source: Adapted from Robert S. Levi, Manufacturing Productivity Frontiers (July 1984), p. 22.

a few developments).

A similar process has occurred in manufacturing. Productivity in this sector has been increasing steadily. As output increased over the years, total employment grew slowly. Direct blue collar employment, in fact, has been fairly constant in absolute terms for several decades (see Table 2).

TABLE 2. U.S. MANUFACTURING EMPLOYMENT, 1960-86

Year*	**All Employees**	**Production Workers**
1960	16,883,000	12,659,000
1970	19,603,000	14,246,000
1980	20,146,000	14,047,000
1986	19,135,000	12,979,000

*Data for June of each year.

Source: Bureau of Labor Statistics, Department of Labor

We are now seeing rapid changes occur in the service sector. While the majority of new jobs have been found here, we see simultaneously such things as an increase in the number of people involuntarily employed part time, and the planned reductions in staff of middle management and other white collar employees at large, profitable companies such as Exxon, DuPont, IBM and Kodak. Clearly, many factors contribute to these current trends, but one cannot discount the importance of modern computer and telecommunications systems which permit large scale reorganization, shifting of managerial and supervisory duties, and the physical movement of part of the work to other locations.

The latter is a particularly disturbing development in some ways. Modern office work is becoming more electronic, and in so doing is becoming location independent. Just as we watched large numbers of manufacturing jobs go overseas as our imports of goods exploded in the past few years, we are now witnessing a similar movement of white collar work. The potential for job loss to the American economy is enormous, for we see not only low level, data entry work moving out (e.g., the transfer of jobs processing used airline tickets from Arizona to Barbados), but the establishment of such higher level work as engineering services in Korea and computer programming in India, services offered to, and used by, American firms. In each case, the selling point is substantially lower labor costs. And in each case, the services are viable because modern computer and telecommunications technologies have virtually eliminated the long delays of the past in bringing the results of the work back to this country.

It is common to view a current situation as an inevitable development, yet at any particular time in the past, choices were available and decisions were taken (either actively or passively). How did we arrive at our current position? With the benefits of hindsight, it is clear that mistakes were made - American manufacturers vastly underestimated the competitive threat of the Japanese, Koreans, and others, and were too slow to adjust to the changing international trade scene; the Administration's mishandling of the U.S. economy produced enormous budget deficits and a dollar which was substantially overvalued for a prolonged period of time; an extreme attachment to a policy of free trade (unshared by any of our trading partners) permitted explosive growth in imports of manufactured goods from low-wage countries, with no offsetting export growth.

It's not simply a question of an inevitable shift from a manufacturing economy to an "information economy". Manufacturing will not disappear, just as agriculture has not disappeared. In terms of value, agriculture and related industries are still important parts of the domestic economy and export trade to other countries. Agricultural employment has been reduced. Similarly, manufacturing remains a vital and important part of the American economy, even as relative employment in that sector drops.

All that this is saying is that productivity has been improving continuously, and that the inevitable result has been more efficient production of agricultural and manufactured goods, producing products with fewer people than would have been required if these improvements had not been made. However, while we usually think of productivity improvements as being positive (and in the long run they are), such developments may lead to problems in the shorter run, and in particular areas.

It is a matter of relative rates of growth of both productivity and output. By definition, productivity is a measure of output per unit time, or

$$\text{productivity} = \text{output}/\text{hours worked}.$$

Looked at broadly, productivity is a measure of output related to labor requirements, or employment. Rearranging terms gives

$$\text{employment} = \text{output}/\text{productivity}.$$

The clear implication of this equation is that rapid productivity growth during a time of a more modest increase in output - not at all unreasonable assumptions given the kinds of technologies available as well as the sluggish performance of many segments of the American economy - can lead to reduced demand for labor. The fears are real.

None of the above should be taken as indicating an anti-technology, Luddite position on the part of American labor. In fact, the opposite has been true. Instead, this analysis points up the importance of dealing directly with legitimate employment concerns related to the introduction of new technologies.

On the other hand, technology, *per se*, is no panacea. In many talks about international competition with knowledgable American manufacturing executives, I have come away with the distinct impression that managerial methods and organizational changes are at least as important as factory floor automation. In fact, I believe that American scientists and engineers have been and continue to be quite innovative. Much is available in the wings. The real problems have been in trying to translate new discoveries into commercially successful products, or in applying new technologies to existing manufacturing systems.

The problems are many and varied. Solutions need to be found at several levels. On the human level, we need to develop policies aimed at minimizing the human costs of "progress". A variety of tools must be developed to assist those who will be most directly affected by technological changes. These include the following:

o Require advance notice of the introduction of new technologies. Ideally, employee representatives should be involved in the planning process from the beginning, but the minimum notice period should be at least six months.

o Encourage retraining of current employees, and the retooling of current facilities, as being far less disruptive than layoffs, plant closings, and new hiring in different locations.

o Establish national training programs to help displaced workers prepare for new jobs in other industries. Much could be learned here from foreign experiences. The Swedes, for example, have a well established program that offers long term training, during which the trainee receives a stipend, and which may involve 1-2% of the total workforce at any given time. Sweden has been a leader in workplace technology development and work reorganization experiments, and has been a successful competitor in international trade while following policies somewhat different than Japan.

o Encourage domestic production as much as possible. Some would argue that the United States cannot be competitive unless we reduce labor costs to a minimum. That kind of narrow thinking brought this country to its present predicament. Certainly, keeping an eye on costs in general is a necessary ingredient in improving competitiveness, but focusing all our attention on what has become a relatively small and declining fraction of manufacturing costs is short sighted. Other approaches must be found, including improvements in product design, process design, product quality, marketing efforts, managerial techniques, energy conservation, and so on. Coupling this approach with less reliance on imports will have a major impact on our trade balance.

o Encourage a longer term outlook on the part of executives and investors. Money used to fight greenmail attacks is not available for investment in new equipment or training. Even without such extreme threats, the constant attempt to show short term gains prevents just those long term, slow yielding investments necessary for the future health of our industries, and for the employment stability of the workforce.

o Investigate the movement offshore of white collar work. The focus here is not the export of services, but rather the export of jobs, with the results of the work being sent back to the United States. This kind of arrangement for office work is still a small part of our business activity, but it is growing rapidly. Now is the time to find out exactly what, and how much, is going on, and to determine the effects on our domestic labor market. As white collar work becomes more international, some changes in American trade laws may become necessary.

The issues being investigated by the committee are of great importance, and also of great complexity. There are no simple answers. The members of the task force are to be commended for tackling these subjects as broadly, and in as much depth, as is evident from your activities to date.

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New Initiatives to Restore Competitiveness.

Prepared for
U.S. House of Representatives,
Committee on Science, Space and Technology

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Summary.

This following discussion of possible initiatives by the Committee on Science, Space and Technology assumes that (1) a favorable economic climate will prevail, suitable to encourage American industry's efforts to become more efficient and reassert itself on world markets, and (2) that this country has missed a beat in the the battle for high productivity, but has not yet lost the war.

While the battle for higher productivity and international competiveness will have to be waged mostly by industry itself, the Federal government could help this country by marshalling its forces by:

(1) encouraging companies with experience in the commercial market to adapt products developed by government-subsidized procurement programs or developed in National Laboratories. I urge the Committee to take the initiative by authorizing a series of seminars to be developed at the Space Center, National Laboratories and selected Energy Department locations for members of engineering faculties as well as interested representatives of industry.

(2) identifying promising technological areas for the year 2000 and beyond, and allocating sufficient research ~~and~~ development funds to ensure that U.S. industry gains leadership in these fields.

Additional measures to promote product and process improvement could be taken with federal support. Among the most promising such initiatives are:

(1) the National Science Foundation having establish a new program byin management science. This program, it is suggested, would stress aspects of management relevant to the adoption of industrial management techniques such as quality control,

(2) funding a study by the National Academy of Engineering to review the current engineering curriculum, so as to ensure that the next generation of engineers receive a more balanced education which stresses some of the practical aspects of engineering and orients them to solving some of the nuts-and-bolts problems which are delaying American industry's adoption of modern manufacturing methods.

(3) publicizing agreements between industry and labor that are fair to both sides and that adopt flexible practices which facilitate the production of new products and the introduction of new processes.

We must hurry to get back on the path to leadership in manufacturing. The federal government has a limited but possibly important role in helping business and labor to achieve this goal.

Introduction.

Most business economists' analysis of developments during the past ten years can be summarized as follows:

> (1) Between 1974 and 1981, the U.S. economy went into shock because of rising oil prices and high inflation rates. The rapid increase in prices depressed equity values, increased the cost of debt financing and caused many businessmen to delay capital investment. Consequently, the country missed a beat in the modernization and new product race. New products were not developed and markets were lost to foreigners. The effects of these setbacks will take a long time to overcome. For instance, the purchaser of every imported car implicitly commits himself to buying foreign replacement parts for many years.
>
> (2) Since 1981, the Congress' inability to balance the federal budget has continued to put American business at a disadvantage: interest rates have remained high compared to those in the countries which captured important segments of the local market, and, until very recently, as a consequence, the dollar has been overvalued. Even at the current more realistic foreign exchange levels, it will take time to substitute local production for imports. In many industries old, existing plants are obsolete or rusted out, and a year or two will be needed to build facilities which can compete with foreign suppliers. It will also be difficult to regain markets from established (foreign) suppliers with a good reputation for service and quality. The cheaper dollar may not stimulate exports as much as it should in those countries, like Japan, where American products are distributed by locals. These distributors may decide not to pass on all the savings from the cheaper dollar to their customers and, instead, increase their profit margins. The struggle to restore the balance of payment will tax American salesmanship.

The legacies of these past years, years which the locusts have eaten, are (1) counter-productive government policies, such as quotas, which must be changed and (2) bad habits which must be overcome if American industry is to remain competitive and American workers are to continue enjoying this country's living standards.

Some policies adopted during the past decade are more deleterious than others. In my opinion, at the head of the list are quotas on imported products. These quotas create artificial shortages for foreign goods and enable foreign manufacturers to charge more and make high profits on products which they distribute themselves in this country's markets. Quotas have encouraged foreigners to (1) establish marketing organizations in the United States, thus making it more difficult for American competitors to dislodge them in the long run, and (2) reinvest the high profits in plant modernization and widen their competitive advantage. These broader problems may be outside of the scope of the Committee on Science, Space and Technology. One hopes they will be "fixed" by legislators increasingly aware of past policy errors.

The slow growth has made many large American corporations inflexible and bureaucratized. There is little that government can do to change current internal arrangements in these companies except, perhaps, enforce anti-trust laws vigorously to promote competition between firms in the same industry.

The scope of the Committee's work challenges it to focus on more difficult, microeconomic issues, dealing with strategies to sponsor productivity growth and improve the competitiveness of U.S, firms. This paper will discuss possible initiatives to achieve these strategies which will encourage product innovation, and improvement in products or in the process of production.

Product Innovation.

A lead in product innovation or the invention of new products contributes significantly to maintaining high standards of living. Innovators enjoy a limited period of time when they can charge high prices for their product, afford higher wages and write off a significant part of their investment in the research and development costs of the new product or process. The first large-scale producer of a new product enjoys additional benefit from learning by doing --lowering production costs through the operation of the learning curve-- which gives the firm an advantage when competitors enter the market.

It has become increasingly important to be the first or second producer in a market. In the case of some new products, most notably in the semi-conductor industry, large investments are needed to mount an efficient operation. Late starters who are not established in the market are no longer able to compete effectively with more efficient producers.

The production of industrial-type chips is a case in point: large-scale producers of chips in the U.S.,a such as IBM and Texas Instruments, were able to withstand foreign competition from Japanese vendors who geared up for mass production. Incidentally, too many Japanese compañies entered the market and their investment in this field has shown negative returns. The moral is that government-sponsored efforts to capture markets may be counterproductive.

One of the most difficult tasks is to encourage the diffusion of good ideas which could result in new products. New areas for opportunities must be actively sought and encouraged. For instance, there is a consensus that American manufacturers have not profited from products or processes that were developed with public funding. Nor have they paid as much attention as they should to the transferability of defense products to the consumer market. Defense contractors without experience in civilian markets do not know how to choose or market such products. Some who tried experienced a financial fiasco.

The challenge is to transfer the experience of manufacturers of military and space hardware to marketing-oriented firms in non-defense fields. In many instances the most promising innovations will consist of adaptations of subassemblies or parts of products to mass consumption. The unreasonably strict secrecy rules will have to be reviewed to make this possible.

The National Aviation and Space Administration has tried, in the past, to interest private firms in adapting products developed for the space program. Its proselytizing effort, carried out mostly with the help of print media, did not produce the desired results. The brochures described past successes rather than new opportunities which would motivate firms to contact the agency.

No one has identified the magic ingredient which makes one firm innovate and another be conservative. To say that this ability depends on leadership is to beg the question. Some industries have an ethos which favors innovation, e.g. computer manufacturers, airframe producers, and, possibly, the drug industry. Surprisingly, much innovation in the United States takes place in service industries. From the mundane mechanization of hamburger frying, which has been exported to many countries, to the imaginative use of computers in facilitating financial transactions, the United States has maintained a leadership role in a number of service endeavors.

Product innovation often relies on the imagination of individuals. A number of consumer electronics products, such as the Walkman, came to market as a result of the determination of a single individual who was highly placed in the company. This tradition of involvement in product design is not part of the ethos of top management in large American companies. By contrast, smaller start-up companies, most notably in personal computers and programming, were founded by technically oriented persons and benefited from the commitment of their top managers to new products, a condition which cannot be replicated either by government fiat or through propaganda.

Sometimes the decision not to fight to stay in the market for old products may be a costly mistake. The case of consumer electronics is illustrative. American manufacturers gave up on the production of radios, a low-markup, slow-growing and competitive market. Record-players and television sets were abandoned next. U.S. manufacturers decided that most mechanical devices or those which require a great deal of manual assembly could not compete with cheap foreign labor. By the 1960's, production migrated to Japan. As Japanese costs increased, the Japanese improved the design of the components and automated the assembly process. Through continuous product innovation and improvement, their plants remained competitive despite pricecutting by manufacturers in countries such as Korea and the Republic of China, where labor costs are much lower. American producers were no longer interested in this market and missed the opportunity to adapt for mass production the video-recorder, an indigenous American invention.

Government can contribute to the process of innovation by encouraging access to the Space Center and National Laboratories as well as selected installations of the Department of Energy where special tools or techniques were, or are being, developed for precision manufacturing, testing, and handling or positioning of material. Many special products developed (on a handicraft basis) in these settings could become commercially viable.

These installations should sponsor seminars and workshops for (a) engineering faculty, and (b) interested members of the commercial community. It is possible to envisage certain National Laboratories and Energy Department installations becoming centers for the dissemination of key techniques. They should aim at runnning summer institutes which would become centers of dissimination of current knowledge in their fields much like the Woods Hole complex of seminars in the biological sciences.

Increased government subsidies for research and development will not affect the short-run competitive position of this country, but in the long run, they may have great influence. For instance, the massive expenditures of the National Institutes of Health are starting to revolutionize the drug industry. American companies are well ahead of the rest of the world in the race for the development of drugs for currently incurable diseases because of the incomparable cadre of trained scientists and state-of-the-art research institutes. The funding for research in medical fields which are starting to pay off began at least ten years ago.

Process improvement.

Success in producing a better mousetrap depends not only on the quality of the innovation but also on the ability to market the mousetrap. Most success stories have more than one dimension. Quality control, most notably the "zero product defects" championed by W. Edwards Deming, is a case in point. The standards for the physical production process are set by using statistical techniques, but the techniques work only if management changes its operating standards.

Managers, according to Deming, should devote more attention to the continuous improvemnt of the process rather than to short-run profitability. They must involve workers in this effort and give up some of their prerogatives so as to allow workers to offer suggestions and make decisions (such as stopping the production) when product defects occur. Case histories of the successful applications of this philosophy stress that long-run costs are better controlled in such an environement. Consequently profit margins improve as well.

These precepts go counter to the accepted philosophy in American manufacturing that product defects should be allowed to occur if the cost of eliminating them is higher than the cost of fixing them. This philosophy has cost American manufacturing a number of markets because these calculations generally do not take into account customer dissatisfaction. They ignore the value of the time (and annoyance) of customers, as any buyer of a new car who visits the dealer to take care of defects is aware.

The National Science Foundation, which recently became concerned with the transfer of existing scientific knowledge to the workplace, does not include management science in its program. No doubt they have been reluctant to enter this applied field because of the difficulty of mounting a credible program. Much of what passes for management science is either faddish or arcane. It is difficult to reach a consensus on the research which needs to be encouraged. On the other hand, there is some evidence that certain techniques, most notably statistical quality control, applications of linear programming, experimental design and analysis will not be integrated into the production process unless managers are encouraged to take into consideration some of the newer findings of research on management.

In order to speed up and facilitate the acceptance of these proven techniques which contribute significantly to increased productivity, the National Science Foundation should sponsor a number of summer institutes which would deal with both the statistical applications relevant to production control and the management procedures needed to implement them. Most courses available today stress only the technical features of statistical techniques. It may be fruitful to orient the seminars to three different publics: senior managers, experts in quality control, and line production managers. Teachers of statistics or production management should also be eligible to attend. The balance of the subject matter for each institute should be tailored to the audience. The institutes for top managers and statisticians would focus more on the management techniques which need to be adopted. The institute for production managers would carefully explain the statistical techniques and cover management aspects more quickly. A close monitoring of the discussion in these courses and seminars may give the Foundation guidance for the development of a program in management science.

Training of engineers.

Getting good ideas to work (be they new products or improvements in the production process which cut costs and increase productivity) depends on the training we provide to people charged with originating and implementing new projects. The engineer is the most important link in this process. Lately, considerable dissatisfaction has been voiced about the orientation and training of engineers. The curriculum of engineering schools is criticized by some who claim the training given to engineers is too theoretical and by others who claim that it is not theoretical enough. Both groups agree that the skills of young graduates do not match the requirements of the market place.

At the root of the controversy are the different career paths for engineers envisaged by the critics. The prestige schools train young people to be analytical and conversant with modern theories in the sciences. They graduate students who either gravitate to the research and development field or, after completing a graduate degree in business administration or law, get jobs outside of the narrow engineering fields. Other, less selective schools whose faculty is often recruited from graduates in the prestigious institutions, try to replicate these programs with varying success.

Because there are many types of engineers (mechanical, electrical, chemical, etc.) and schools with different orientations, it is dangerous to make generalizations about recent graduates. Nevertheless, a number of suggestions by employers of engineers recur often enough to be repeated.

With the exception of chemical engineers, most engineering school graduates have little experience with either apparatus or practical problems. The elite engineering schools, and those which aspire to be highly regarded by their academic peers, devote much less time to practical engineering aspects than they did thirty or forty years ago. The training of their graduates fits quite well with the work of research and development groups where engineers are supported by paraprofessionals.

By contrast, newly-graduated engineers who work in production are not trained to deal with the problems encountered routinely on the factory floor. Many never learn how to handle them. This is one of the explanations for the high attrition rates among engineering graduates who opt out of the field and choose other occupations -- their school training did not give them any preparation for the tasks which they are asked to accomplish.

A frequently mentioned stumbling block on the way to improving production processes in American industry is the trend for many engineers to be located far away from the shop floor. They work at data processing terminals, scheduling production and checking on its progress. They are not exposed to the problems of workers and not challenged to do the small marginal improvements which rationalize and cut costs in making a product.

In Japan or Germany, where the automation of paper-work and the use of data processing are not as pervasive as in the United States,the locus of work of engineering staffs is quite different . In these countries the majority of engineers get the opportunity to dirty their hands by being stationed closer to workers. They observe the production process, interact with people on the production line, and either work jointly or suggest small fixes which raise the productivity of workers or the quality of the product, or both.

Another reason why our products do not get designed as well as they should be is that production and development engineers have separate career paths. Large Japanese and German companies start out their engineers in production and only later promote them to research and development staffs, ensuring that designs are made by persons familiar with the day-to-day problems of pushing a product out of the door.

Despite all its shortcomings, the American organization of engineering staffs is not without its advantages: it enables companies to adopt some productive innovative techniques more rapidly. The recent experience with CAD/CAM is a case in point. Our engineers have more experience using computers than those in foreign countries and are far ahead of the rest of the world in designing products with the aid of computers.

Unfortunately, they are less interested in improving processes which require mechanical devices. This failing slows down the adaptation of some of the more promising automation techniques in industry. For instance, the principal stumbling blocks in adapting automation to discrete production processes (as contrasted to continuous operations such as oil refining) are the problems of (1) transporting semi-finished components from one work station to another and (2) positioning them correctly at the next work station. Most American industries, to put it charitably, have not marshalled the necessary talent to gain leadership in these tasks. Only if a dramatic breakthrough, such as the utilization of new superconductive materials, simplifies all these tasks (and it is possible that wide-ranging but not pervasive applications will be developed during the next decade) will these stumbling blocks in improving competiveness of American industry be removed. Under most conceivable scenarios of technological developments, many engineers will require more training than they are getting in dealing with mundane, mechanical challenges in improving production processes.

If past experience is any guide, government cannot have much impact on what our colleges and universities teach. Professors, especially those with tenure, are an ornery lot who teach subjects in any way they like. As long as there is no consensus in industry about the type of engineers we really need, there is little likelihood that a successful effort can be mounted by business either.

This does not mean that the Committee should write off all initiatives in this field. The Committee should give serious consideration to funding a review of the engineering curriculum for each major engineering specialty by the National Academy of Engineering. The Academy should be instructed to give particular attention to the experience of schools, such as the North Carolina State University School of Engineering, which integrated in the curriculum a number of "clinical" or practical courses taught by adjunct professors who are leading practitioners in their field. A restructured curriculum with a balanced emphasis on applied engineering which uses the expertise of practitioners would also ease the shortage of engineering faculty, one of the most common complaints of engineering schools.

Work Rule Flexibility.

Most economists agree that it is wasteful to offer incentives for business or labor to do things which they ought to be doing but do not know how to do. However one can attempt to influence the business sector's attitude towards change. One of the thorniest problems in many large, highly unionized businesses is the negotiation of a new set of work rules whenever mangement wishes to increase efficiency. In the past few years, work rules -- really labor's privilege to have a say about the way work should be performed-- have been abolished unilaterally by management. In some instances these 'take-backs" have incited labor to strike. In others, they have soured the attitude of workers towards their company. The prevailing ethos is that the abrogation of work rules is less disruptive if it is accompanied by a quid-pro-quo such as increased employment security. The advantages of various packages which are reputed to have kept labor peace and safeguarded morale have not been evaluated. A disinterested study of patterns (and costs) of labor-management cooperation which facilitate innovation could encourage both management and labor to enter into such agreements. Congressional sponsorship of such a study is recommended.

Statement by

The General Motors Corporation

Submitted to the

Technology Policy Task Force
Committee on Science, Space, and Technology
U.S. House of Representatives

August, 1987

Human Resources

A key element of GM's long-term competitive strategy is the creation of a motivated, informed, and involved work force. GM is working to achieve effective and full realization of human potential by encouraging the involvement of employes in decisions that directly affect their jobs and their workplace environment, an environment that enables all employes to realize their capacities for growth and individual team performance.

Important to GM's efforts to tap this potential are the Quality of Work Life (QWL) programs in place at virtually all of the Corporation's North American units. QWL allows for new ways to encourage employes to use their talents and skills in contributing to the success of the business. It fosters teamwork, emphasizes self-direction and self-control, and involves employes at all levels to become involved in problem solving, data analysis, and decision making. Increasingly, GM is using team concepts as part of the QWL program in which there is a high degree of employe/management involvement in matters affecting the workplace.

Advances brought about by QWL are not always easy to achieve. Some workers, for example, can be hesitant about giving up the familiar for the new, untested, and risky. Some managers, in turn, see their status and their prerogatives threatened by a new culture and the change to a more-participative style of management.

Overall, however, QWL is becoming an accepted practice. Many plants with QWL programs and active employe participation have experienced improved quality and productivity, decreased absenteeism, and improved management-union relationships. While these are not the primary goals of QWL, they do reflect the additional benefits that can be achieved from the program.

Plant Closings

When GM embarked on its strategy of new plant construction and modernization of facilities, it was recognized that there would be a period of overlap when older plants would be kept running to assure a smooth transition as new plants came on stream. Once the new plants were in full operation, it would eventually become necessary to begin phasing out the older, redundant plants. This point was reached in November 1986 when GM announced it was phasing out, over a period of time, operations at 11 North American assembly and metal fabrication plants. This decision was made after months of extensive deliberation that looked at a wide range of factors, including market demand for a particular plant's products, age and condition of facilities and equipment, geographic presence, and ongoing performance -- the ability of the plant to produce quality products at competitive costs.

It was a difficult decision for GM to close these facilities because of the impact on the lives of the employes affected and the communities in which they live. But it was a business decision that had to be made to enhance the job security of a far greater number of GM employes across the country.

General Motors is committed to working with its hourly and salaried employes, union officials, and commuity and government leaders to reduce the impact of these closings. Transition teams, which include union representation, are being established at each affected plant to assess the magnitude of the adverse impacts on employes and the community at large and to review existing Corporate, Federal and state governmental programs to assist displaced workers.

Benefit Programs

When GM closes a plant, it does not simply lock the door and walk away. The fact is announced well in advance -- in many cases, at least a year before final close down. Every effort is made to transfer affected employes to other GM locations, retrain them for other work, or retire them under the generous provisions of the GM retirement programs.

To assist workers being displaced, GM has a comprehensive set of benefit programs for both hourly and salaries employes to cushion the impact. These programs vary in their applicability to individual employes.

Laid-off hourly employes with one or more years of seniority are eligible for Supplemental Unemployment Benefits (SUB), a continuation of life and disability insurance, and most health care coverages. Insurance is available, depending on seniority and/or credited service, for up to two years at Corporation expense and an additional year at employe expense. SUB, when added to Unemployment Compensation and other earnings, provides an income level equal to 95% of the employe's after-tax pay, less certain work-related expenses not incurred during layoff. Depending on seniority and SUB Trust Fund level, such benefits may be payable for up to two years. When SUB benefits are exhausted, hourly employes with 15 or more years of seniority (10 or more years in a plant-closing situation) are eligible to receive Guaranteed Income Stream (GIS) benefits. GIS benefits supplement Unemployment Compensation and other earnings up to an income level of 50% to 75% of pay (depending on years of seniority), but not more than the employe's regular SUB level. Supplemental health care coverages and $10,000 of life insurance also are provided at no expense to the employe. GIS benefits may continue until other GM work becomes available or the employe retires.

Laid-off employes are also eligible for assistance in retraining under programs jointly administered by GM and the UAW. One of GM's most significant retraining opportunity programs for hourly employes pioneered in the 1984 National Agreement with the UAW, is the Job Opportunity Bank-Security (JOBS) program. Employes with a year or more of seniority who are laid off under circumstances prescribed in the National Agreement go into the JOBS program where they are eligible for a variety of assignments, training, and placement help while receiving full pay and benefits.

Eligible laid-off salaried employes with one or more years of service are covered by a Layoff Benefit Plan which, when added to Unemployment Compensation and other earnings, is equal to 75% of salary for the first six months of layoff and 60% of salary for up to the next 18 months. Salaried employes also are provided with life insurance and most health care coverages for up to 25 months following layoff. When these benefits are exhausted, the Income Protection Plan (up to 60% of salary) takes over for employes with 15 or more years of service (10 or more years in a plant-closing situation). These benefits may be payable until other GM work is available, or the employe retires. Supplemental health care coverages and life insurance also are provided.

Salaried employes may also be eligible for retraining programs similar to the JOBS program for hourly employes. In addition, eligible laid-off salaried personnel have their qualifications compiled in a data base. Every GM unit in the U.S. has access to that file and is obligated to review it before hiring or transferring salaried employes.

Training Programs

While technology is an indispensable tool in the competitive equation, human resources are equally important, and the key is to effectively integrate -- and train -- people to handle the new technology and sophisticated tools to achieve the efficiencies that deliver the best products to customers. Toward this end, GM has undertaken a massive training and educational effort that is preparing people not only to be competent at their present jobs, but also prepared for the next step along the way.

GM and the UAW have developed the world's largest privately funded educational system with a "student body" of more than 300,000 employes, as well as displaced workers, on whose behalf over $200 million is being spent for training, retraining and related activities. A number of joint training activities have been developed to help workers prepare for and keep pace with the new technologies and manufacturing processes being introduced and to retrain workers displaced by plant closings in new skills.

These programs, carried out at local GM plants and area centers, are jointly administered from a recently dedicated UAW-GM Human Resource Center located just north of Detroit. The Human Resource Center is the national headquarters for joint skill development and training. The Center places GM and UAW staff employes side by side and calls on each to contribute to the development and implementation of programs to assure progress in human relations and new technology.

Area training and retraining centers have been established at eight locations around the country to serve the needs of both working and laid-off UAW-represented GM employes. Four of the centers are located in Michigan (Detroit, Pontiac, Flint and Saginaw/Bay City). Others are located in Buffalo, New York, Indianapolis, Indiana, Nashville, Tennessee, and St. Louis, Missouri. Funds to operate the area centers come from a special GM-UAW national training fund that was first negotiated in 1982 and expanded in the 1984 contract negotiations. The centers offer services in skills assessment, career counseling, job placement, and retraining. The retraining programs have placed laid-off employes in a variety of jobs including computer operators, machine repair, electronics, certified commercial truck drivers, and law enforcement and private security.

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STATEMENT BY RUDY OSWALD, DIRECTOR OF ECONOMIC RESEARCH, AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATION, TO THE TECHNOLOGY POLICY TASK FORCE OF THE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

July 1987

Industrial Policy and Industrial Transition

America needs a coherent and comprehensive industrial policy to rebuild the U.S. economy, to speed up healthy, balanced economic growth and industrial transition, to strengthen the nation's response to international economic competition, and to support and develop and utilize technology more effectively in the nation's interest.

To maintain economic and national security and to meet international challenges, America must push forward with new technology industries. But we must also maintain our basic industries and we must achieve faster progress and technological innovation in our basic industries which are essential to national economic power.

An effective U.S. industrial policy should:

* Provide a foundation for a long overdue full employment policy through which economic opportunities for all Americans would be expanded.

* Operate on the basis of labor, industry, and government working together with concerned public interests in an industrial strategy council to strengthen the overall economy and specific, individual industries.

* Include an economic and social contract with firms benefiting from direct industrial policy assistance with company commitments to respect workers' rights and to meet equal opportunity, occupational safety and health, and environmental standards.

* Seek to make each American industry as strong as possible, with specific complementary contributions from management, government, and labor, rather than engaging in any futile effort to "pick winners and losers" or to promote one kind of industry at the expense of others.

* Marshal adequate public investment resources through a bank for national industrial development to provide the financing needed for loans, loan guarantees, and equity positions to support agreed-upon industrial investment and technology-modernization programs.

* Establish a priority program of productivity-raising public investment in our eroding public infrastructure -- the roads, rails, bridges, ports, public buildings, and water systems without which no industries can be competitive.

* Provide a framework for overhauling and coordinating tax, trade, interest rate, job training, and other policies which now often lead to the undermining of American industry and jobs.

A number of states have instituted programs aimed at economic revitalization and growth. State government initiatives can help in industrial development, but only in a limited way. In addition to funding limitations, the states do not possess the federal government's power to deal with other countries in matters of trade and coordination of economic policies, particularly on monetary policy and the related matters of interest rate levels and foreign exchange rates.

A national industrial policy can help coordinate these critical policies to support a healthy, diversified, technologically progressive economy for the benefit of all Americans.

One essential component of a sound industrial policy is effective worker adjustment and plant closing legislation to protect workers and local communities against some of the adverse effects of plant closings and mass layoffs. I respectfully request that the attached AFL-CIO issue paper, "Plant Closings," be included in the printed record with my statement.

Workers, Unions, and Technology

Workers and their unions have a direct and vital interest in technological change. Unions recognize that technology brings potential benefits -- new jobs, safer and easier work, higher productivity, higher levels of living, and more leisure. Unions also recognize that changing technology has potentially destructive effects on workers and on society — loss of jobs, loss of earnings and income, downgrading of skills and experience, new threats to the environment and to workers' safety and health, dehumanization of work, polarized income distribution, alienation, and social instability.

There is no logical or inevitable tradeoff to be made between technological progress and the welfare of workers. But if such a choice is forced on American workers, it should come as no surprise that workers and their unions will make every possible effort to humanize technological change, to ensure that people get priority over technology and productivity and efficiency, and to make human values prevail.

The long-run benefits of progress and the long-run necessity of change are easier for workers to accept if the workers know that job security and income security are protected. Workers want to share in the benefits of technological change and technological progress without bearing an undue or unfair share of the burden of change, progress, and adjustment. And workers want to participate, through their elected union officials, in the decisions that are going to affect their lives. Too often such decisions are made unilaterally by faceless absentee management. More involvement by workers and unions, more joint decisionmaking, more industrial democracy can raise the quality of working life and raise the quality of humane adjustments to new technology.

In addition to progress achieved through labor/management collective bargaining and work-place democracy, American workers and their unions are looking for a more rational and effective way to avoid adverse effects from changing technology and to achieve faster economic progress through deliberate national industrial policy. Persistent high unemployment, low economic growth, international economic competition, and deterioration of the social capital that encourages economic progress have reenforced labor support for conscious national planning to assure a healthy, growing, diversified competitive economy -- one that creates enough jobs, raises the quality of life, maximizes beneficial effects and minimizes negative effects of technological change.

Income distribution is another problem that concerns workers and their unions as they look at the employment shift from goods-producing to services-producing industries and at the earnings distribution among and within industries. Unions are concerned about the prospect of a two-tier, high-skill and low-skill work force without a solid middle-skill, middle-income center. The weakening of America's middle-income, middle-class presents serious implications for the consumer-buying base of the U.S. economy and for political democracy and social stability in the United States.

Labor-Management Cooperation

The potential for misusing technology is great, but the possibility of human progress through the wise and humane use of technology is equally great. The opportunity for new technology to be introduced with minimal social disruption will be greatly enhanced if workers and employers have an equal opportunity for discussion and joint decisionmaking on the subjects of changing technology and the quality of working life.

Collective bargaining, an established institution in our democratic society, has been a fair and workable process for joint labor/management decisons on wages, working conditions, and other major issues. It is, therefore, a logical mechanism for increasing the involvement of workers in such areas of decisionmaking as adjustment to new technology.

New technology and rising expectations that work should be humane for workers as well as profitable to business are forcing transformations in the work place. Human and social values must be more highly esteemed in the production process -- not only when the process is producing goods and services and jobs but also when it is producting cultural and social effects, including leisure and unemployment. The human desire for greater autonomy and greater participation in decisionmaking on the shop floor, in the corporate boardroom, and in national economic policy making must receive higher priority. Improvements in the quality of work life (QWL) include better occupational safety, health and work organization, improved work environment, better long-run investment, employment, and training decisions, and the introduction of new technology. These QWL issues are logical subjects for joint labor/management negotiation and decision. But employers must not use QWL as a disguise for union busting.

Labor unions today jointly participate with management in thousands of safety committees, apprenticeship committees, communitywide labor/management committees, quality-of-work-life committees, quality circles, and other joint labor/management efforts. As a result, labor/management committees are joining together to deal with matters of mutual interest such as foreign trade, federal, state, and local programs, community philanthropic purposes, and revitalization and strengthening of their industries and their communities. Some committees give workers a direct voice in the issues of the work place, including investment and innovation with new technology.

Only the collective-bargaining stature of their unions establishes workers as real partners in those labor/management committees. Actions that weaken a union, distort the balance in its relationship to management, or weaken the union's ability to represent its membership will damage that union's ability and desire to participate in committees of any kind with a particular management. Programs that strengthen the union's ability to grapple with the new issues that union members want addressed, including technology change issues, and programs that hold out real promise for the expansion of work place democracy will get sympathetic attention from workers and their unions. Every union must continue asserting its rights and those of its members to be accepted as legitimate equals in a partnership with management, with collective bargaining as the essential foundation for labor/management cooperation.

Trade Crisis and Competitiveness

The trade crisis, exemplified by last year's trade deficit of $170 billion, and the disappearance of 2 million manufacturing jobs in the past 8 years, calls for effective action by the Congress to try and address the numerous factors that have contributed to this "loss of competitiveness." There is no one action alone that will solve this crisis. However the trade legislation moving through Congress in 1987 combined a number of approaches that clearly would provide various mechanisms to deal with this crisis.

Competing in international markets depends upon U.S. policies, as well as policies of foreign countries, and the response of the U.S. government to such foreign policies. The actions and policies of multi-national corporations also affect decisions on the laws of production and investment.

Most foreign nations manage their economies and structure their trade flows to promote their own industries and economic development. Currencies are devalued, specific products and industries are subsidized, and a variety of actions are taken to regulate imports and exports. Many countries deny worker rights and protections and actively engage in predatory practices to enhance profits and "competitiveness."

Over the last few years, the Administration has relied essentially on the depreciation of the dollar, the need for the country's major trading partners to pursue expansionary policies, a rhetorically tougher approach to foreign trade practices, and a new round of multilateral trade negotiations. But the trade crisis continues. In his State of the Union address, President Reagan raised the issue of competitiveness, putting heavy emphasis on "increasing investment in human and intellectual capital."

However his budget does just the reverse. It substantially cuts funds for education. The President's trade proposals do nothing to substantially reduce the massive trade deficit.

I respectfully request that the attached article, "Roots of the Trade Crisis," by AFL-CIO economists Arnold Cantor and Mark Anderson, be included with this statement in the printed record

The Job and Income Crisis

The trade crisis has contributed substantially to the job and income crisis facing the nation.

A comparison by decades tells the unemployment story:

— 3 million were unemployed in the average month in the 1950s and that went to

— 3.5 million in the 1960s;

— 5.8 million in the 1970s; and

— 8.2 million in the 1980s.

And the unemployment rates went from

-- 4.5 percent in the 1950s, to

-- 4.8 percent in the 1960s;

-- 6.2 percent in the 1970s; and

-- 8 percent in the 1980s.

In each year since 1980, more than 20 million Americans have suffered from unemployment at some time during the year.

Two million jobs have been lost in manufacturing since 1979 in a wave of plant closings and mass layoffs while the country refused to adopt a realistic, coherent trade policy.

By contrast, jobs in low-wage service-producing industries have increased by 10 million since 1979.

A recent report for the Joint Economic Committee by Barry Bluestone and Bennett Harrison shows that jobs added to the economy between 1979 and 1984 were disproportionately at the low end of the wage and salary scale -- 6 out of 10 were below $7,000 a year in 1984 dollars. The report notes that 97 percent of the job gains among white men were in this low wage category -- so we know the problem of low wages is not limited to women and minority workers. In fact, minority men and women are suffering from a renewed trend toward low wages which reverses the trend toward higher wages for minority men in the 1970s.

The de-industrialization of America with plant shutdowns and mass layoffs is the result in large part of massive import penetration and massive trade deficits and an unregulated wave of corporate take-overs and corporate mergers which are eliminating many jobs that have been the foundation of America's solid, middle-income, middle-class society.

The Labor Department has made two studies of displaced workers whose jobs were abolished or plants shut down since 1979. They found about 11 million workers lost their jobs in each of two five-year periods.

Fifty percent of the lost jobs were in basic manufacturing -- primary metals, transportation equipment, and machinery.

Two-thirds of the job losers were blue-collar workers and one-third were white-collar workers.

One-third of the displaced workers were unemployed or out of the labor force at the end of the second five-year period.

The average real earnings loss for displaced workers who subsequently found a job was 10 to 15 percent -- but 30 percent of the re-employed blue-collar workers and 24 percent of the re-employed white-collar workers had earnings losses of 25 percent or more.

This adds to the accumulating evidence that the shift of jobs from goods production to service and sales jobs is leading to fewer middle-income jobs and more low- wage jobs.

Average earnings in manufacturing are over $400 a week. But in the areas where the most jobs are created, in the service sector, average earnings are much lower -- $177 a week in retail trade, $269 a week in the service industry.

There are more than 15 million workers in America who are paid at or around the federal minimum wage of $3.35 an hour -- far below the $5.30 an hour necessary for a wage earner to lift a family of four out of poverty.

And the minimum wage law has not changed in six years even though the cost of living has increased 25 percent, reducing the real value of the $3.35 minimum to $2.50.

To this country's shame, only one-third of unemployed workers are getting unemployment insurance payments.

America's middle class is suffering also with a drop in family buying power.

Median annual income for all American families -- measured in dollars of constant buying power -- dropped 4.5 percent from 1979 to 1985 -- from $29,029 in 1979 to $27,735 in 1985. The loss of family income would have been far bigger if there had not been a big increase in the proportion of two-earner families since 1980.

The country is moving toward a split-level economy with more high-pay, high-skill jobs for a few executives, scientists, engineers, professionals, and managers at the top -- with more low-pay, low-skill, part-time, temporary, high-turnover jobs at the bottom -- but a smaller and smaller share of middle-level, good-pay, permanent, full-time jobs, the kind of jobs that offer hope and opportunity and entry into the middle-class mainstream of American life.

I respectfully request that an article, "Where Have All the Good Jobs Gone?" by two AFL-CIO economists, Arnold Cantor and Frank Parente be included in the printed record with this statement.

U.S. Productivity

Workers in this country produce more goods and services per employee or per hour than workers in any other major industrialized country in the world. American workers and industries in 1985 were one-third more productive than their counterparts in Japan and the United Kingdom and one-quarter more productive than Italian workers, according to Bureau of Labor Statistics data on production per employee in 1985. Productivity levels in West Germany and France came closest to those in the United States but still lagged by 7 percent.

Recent estimates of manufacturing productivity in output per hour show the United States leading Great Britain by 100 percent, Canada by one-third, Germany by one-quarter, and Japan by 9 percent.

The 1987 report of the President's Council of Economic Advisors comes to the conclusion that "the deterioration of international cost competitiveness in U.S. manufacturing during the first half of this decade was the result of the real appreciation of the dollar, not sagging productivity growth or excessive wage increases."

However, even if international trade and international exchange rate problems of the United States were to be solved overnight, America's productive position would still depend heavily upon human and capital resources.

Various studies of American economic growth demonstrate the importance of education and training in contributing to productivity and innovation.

The nation's productivity and competitiveness depends first and foremost on the quality of America's workforce. It is the people of the United States who are the foundation and the source of economic achievement and future progress.

The knowledge and experience, the education and training, the know-how and know-why of American workers are key factors in explaining productivity and competitiveness.

The social and political traditions of the nation's democratic society, the freedom and flexibility of its diverse, pluralistic society, and the institutions of free trade unions and collective bargaining are also essential ingredients in the national pursuit of higher productivity and a greater degree of competitiveness in the world economy.

Clearly capital plays a key role in economic growth and productivity. Capital provides the tools for production, and the infrastructure needed to support development.

Another important factor in productivity is the complementary activities of labor and management. Good labor-management relations are an important factor in blending together innovation, capital, and work in achieving improved output and competitiveness.

Education

Education, training, employment and labor-management relations play a role in enhancing the nation's competitiveness.

From its earliest days, organized labor has been in the forefront of the effort to establish and expand educational opportunities for workers and their families. The best possible public education should be available for all who seek it to the limit of their potential for achievement. This country should have an educational system that will extend the promise of a democratic society to all citizens and provide the nation with an educated and skilled work force for its enrichment and defense. Therefore, labor has championed the establishment of a universal public school system. We have advocated compulsory schooling, quality vocational training, English classes for new immigrants, rigorous curriculum in the classrooms, recognition of the dignity of teachers through organization and just wages, federal aid for elementary and secondary education, and federal financial aid for higher education. Investment in education is investment in human capital. Thus, education has to be a priority.

While more needs to be done, America has made considerable progress in educational achievement. In 1900, ten percent of the U.S. young people graduated from high school; today, 74 percent graduate. In 1970, one of seven workers had a college degree; in 1986, one of four workers has a college degree. These results would not have been possible without government programs -- Head Start, Chapter I, TRIO, Pell Grants Guaranteed Student Loans and other programs that expand academic and cultural standards.

We compliment the Congress for supporting these targeted programs, and we urge continued support. The essential local management of education must be augmented by federal help and leadership. Educationally disadvantaged students from low and middle income families have gained from the Chapter I programs of the Education, Consolidation and Improvement Act (ECIA) and even more from the earlier Elementary and Secondary Education Act (ESEA). These services should be available to every child who is eligible at the elementary school level rather than the approximately 45 percent currently receiving benefits. Chapter I remedial services at the secondary level should be authorized. Similarly, funds to assist schools in desegregation must be maintained.

The vocational education program proves modest amounts of federal funds can lead to programs that raise standards, expand opportunities for the disadvantaged and disabled and encourage partnerships with labor and business. The AFL-CIO supports a continued federal commitment to a leadership role in vocational education and opposes the proposed phaseout of funds.

In terms of higher education, we urge Congress to seek ways to improve on the grant/loan-work package of the 1960s and 1970s -- and we oppose Reagan Administration proposals which would leave college students even more deep in debt when they graduate. Expansion is needed in programs that provide work and education such as cooperative education, work-study, Perkins Scholarships, and maintain in-school subsidy for guaranteed student loans with modest interest rates if higher education is not to be limited only to the very wealthy. Pell Grants and guaranteed student loans have in the past opened the doors of higher education to low and middle income families and to increasing numbers of minorities. These grants should not be sacrificed to the Administration's pilot program which has escalating interest rates and already has been found wanting even by the people who are expected to provide the loans. The President of the Consumer Bankers Association, whose membership provides more than 80 percent of total student loans in the United States, termed the Administration proposals wholly unacceptable and predicted that few if any lenders will participate.

The nation must prevent higher education costs from restricting opportunity. Tomorrow's youth will come increasingly from single-parent, low-income, minority families. The poorest segment of today's population will be the workers of tomorrow. When these young people enter the labor force, they will need something better than the pay levels of the service jobs being created today.

Worker Training

The AFL-CIO has long supported human resource and productivity development through more and better education, training, retraining, upgrading, and upward mobility oportunities for all workers, both employed and unemployed, including dislocated workers and low-wage workers. Jobless workers should have the opportunity for training in skills that lead directly to jobs. There should be better job placement through a strengthened nation-wide Employment Service and better matching of workers and jobs. All these efforts can add to the nation's competitiveness.

The task force appointed by the Secretary of Labor to study the problem of plant closings and worker adjustment, in its January 1987 report, declared that adequate advance notice is essential for successful adjustment programs and the task force declared that serious problems of worker adjustment and local community adjustment now occur because corporate management rarely gives adequate advance notice.

The federal government has a responsibility to protect U.S. workers and local communities against the devastating consequences of plant shutdowns and mass layoffs. In order to adequately plan for adjustment, corporations must be required to provide adequate notice of corporate intentions to close a facility and provide other protections for workers and local communities, including active and fully financed labor market programs, with job training and adequate income support. Such a program must build on the Current Title III Displaced Worker program, and in addition to, and not a substitute for, an effective Trade Adjustment program. The new program should involve more active participation by labor and management at the national, state, and local level.

Union-Education and Retraining Efforts

The Education and Training for American Competitiveness Act 1987 is a welcome proposal that builds upon existing proven programs, and expands them to more effectively deal with today's problems in literacy training, vocational education, and math, science and foreign language training. The new trade-impacted worker assistance provision would provide needed income for workers while undergoing retraining, but are currently not receiving either Unemployment Insurance or Trade Adjustment Assistance.

Unions have been working in partnership with industry, local government, often through collective bargaining to address many of these education and retraining problems:

1. The United Auto Workers/Ford Motor Company Employees Development and Training Program and a similar joint program of the UAW at GM, established in 1982 offer training, retraining and developmental opportunities for active and displaced UAW-represented employees. The programs have a national framework but are essentially a local undertaking. Basic skills, counseling and job search techniques are offered in-plant, and the program can take the UAW member into college classes.

2. Training and Education provisions of 1986 contracts of the Communications Workers of America and the International Brotherhood of Electrical Workers in the telephone industry deal primarily with off-hours personal and career development training. The CWA/AT&T program will be administered by a new non-profit corporation, the Alliance for Employees Growth and Development. It will provide career counseling, and retraining from accredited colleges and schools to active and laid-off workers. CWA and Pacific Telesis have a similar program coordinated through California's extensive community college network.

3. AFSCME District Council 37 and the City of New York offer adult literacy, basic education, high school equivalency and career training programs. More than 1000 are currently enrolled.

4. The International Ladies Garment Workers' Union (ILGWU), with four other AFL-CIO local unions in New York City, run a worker-family education program for learning English as a second language. The 35-week program is run cooperatively with the State Education Department and the New York City Board of Education. Almost 800 students have enrolled.

5. Most of the building trades unions and many of the metal trades, and printing trades unions run extensive apprenticeship and upgrading programs. These programs not only provide the basic skills for craftsmen, but also keep those skills up-to-date. These programs are usually jointly developed with management.

6. Various maritime unions have established extensive residential training facilities for new recruits, as well as for upgrading and promotion opportunities.

These are but a few examples of the ways unions are working cooperatively with new strategies aimed at fulfilling their traditional goal -- extending the opportunity for education for all who need it. They may be models from which others can learn as collective bargaining cooperation tailors solutions to specific needs. Organized labor's historic commitment to expand educational opportunities will be even more important in the new work place and the new technologies of the future.

The experience of the United Auto Workers with General Motors and Ford on jointly developed education-training-retraining programs, and the experience of other unions working jointly with management on education and training and dislocation-avoiding or dislocation-reducing programs suggests that there is a vast and only partially tapped opportunity for constructive labor-management cooperation on productivity-raising training.

Such training is useful and beneficial to workers and employers in raising productivity and enhancing competitiveness. It also provides invaluable assistance to workers who face displacement and dislocation.

Labor Programs to Enhance Competitveness

Let me note that there are other actions -- in addition to education and training -- which contribute to the nation's productivity and competitiveness.

Pay equity for women, and other anti-discrimination, equal employment opportunity, and affirmative action not only have basic social justice objectives but they also encourage workers to achieve thier fullest possible productivity in the economy and they encourage employers to employ workers up to their fullest potential.

Likewise day care, parental leave, and other family protection legislation will not only strengthen family life but also enable workers who are parents to participate in the economy more freely and fully, without fear and anxiety about their children.

An updated minimum wage would assure that the earnings of workers at the bottom of the economic ladder will be brought back into line with the earnings of other Americans.

Labor-Management Cooperation

An important element in competitiveness is good labor-management relations. Good labor-management relations are achieved through building upon a solid collective bargaining base that allows workers to participate in the decisions that affect their work, work-place, and return for their work. The democratic involvement of workers through their unions in collective bargaining and in special additional new cooperative programs has raised the productivity of America's industries.

Unfortunately, too often, instead of labor-management cooperation, instead of management acceptance of workers' right to organize and bargain collectively, workers and their unions encounter active management hostility and union-busting.

Such actions by employers are unconscionable. The nation's basic labor law promises to workers the right to organize and to bargain collectively with employers through representatives of the workers' own choosing without employer coercion and without violation of workers' basic civil liberties and human rights.

Too often workers' rights are violated directly by management in collusion with sophisticated, expensive, union-busting consultants. And too often workers' rights are violated indirectly, as for example, by "double-breasting" contractors who set up low-wage, non-union companies to compete with their own unionized operations.

Public Policy and Labor Displacement

New technology often eliminates some jobs and changes the job content, skill requirements and work flow of others. Technology often causes changes in industry location -- shutdowns of departments and entire plants and shifts to new locations in suburban or outlying areas and sometimes overseas. No industry is immune to such changes, which are constantly shifting the structure of skills, occupations, jobs, and earnings of American workers.

More information is needed on the effects of technology on workers. Federal action is needed to set up a clearinghouse to gather information on a continuing basis on innovation and technological change and its effects on the welfare of the American people, on jobs, skills, training needs, and industry location. There are few economic studies of the effect of technological shifts because there is no systematic data gathering relating to the changing technology of American production. With more complete information, public and private adjustment programs can better avoid needless human hardship and suffering, which too often result from the disruptive impact of changing technology. Through this clearinghouse, the federal government could provide unions and employers with comprehensive information and service, on request, to help develop labor/management solutions for the complex problems caused by technological change at the work place.

Technology-caused economic dislocation and other kinds of dislocation -- including plant shutdowns caused by corporate merger mania and by recession, job loss from trade policies, and production shifts away from defense-related industry -- require cooperative labor/management efforts and also national programs to deal with these complex problems. Further exploration is needed of programs that deal with plant shutdowns and plant relocation and with reconversion of defense-related industry.

Occupational training and retraining may perhaps help displaced workers acquire new skills and new jobs -- but such new jobs may provide lower skill levels and pay. Furthermore, the loss of an industry and the skills that go with that industry diminish the essential diversity and pluralism required for a healthy economy and society.

For labor it is crucially important to require employers to recognize responsibilities to their employees and communities before they shut down a plant and to provide economic protections to workers and their families who must suffer the consequence of too hasty corporate action. There is nothing radical or unusual about national legislation that requires advance notice and other worker and community protections. In other nations, private business firms -- including affiliates and subsidiaries of many American firms -- find they can live with laws requiring advance notice and other protections for workers and communities against the adverse effects of economic dislocation and plant shutdowns.

Conclusion

Workers and their unions have reasonable concerns about loss of jobs and loss of income. They also have reasonable and legitimate concerns about the nation's economic strength, national security, and social equity or fairness. If these concerns are met adequately and effectively, workers will be much more willing to accept and adjust to changing technology.

Without full collective bargaining -- no matter how enlightened or benevolent management may be -- working men and women simply don't have a sense of participation in the basic decisions that govern their jobs, income, and lives. Collective bargaining helps workers share the benefits of technological progress and meet the challenge of technological change with a minimum of social and human dislocation.

A healthy, expanding, full-employment economy is an essential environment for collective bargaining to be effective in protecting workers against adverse effects of technological change. Workers and unions, therefore, have an interest in national economic policies that will modernize and revitalize the American economy. And workers want the dignity and enhancement of human values that come from income protection, training and advancement opportunities, and productive jobs.

Attachments:
(1) "Plant Closings - Workers and Local Communities All Over U.S.A. Suffer from Plant Closings, Mass Layoffs"

(2) "Roots of the Trade Crisis"

(3) "Where Have All The Good Jobs Gone?"

(4) "Productivity -- Policies and Problems"

AFL-CIO Reviews the Issues: - April 1987 - Report No. 12

PLANT CLOSINGS

WORKERS AND LOCAL COMMUNITIES ALL OVER U.S.A. SUFFER FROM PLANT CLOSINGS, MASS LAYOFFS

Plant closings and mass layoffs strip three million workers of their jobs every year.

Workers and their families and the local communities in which they live suffer massive human tragedy as well as economic and social dislocation.

The manufacturing sector of the U.S. economy has been especially hard hit by plant closings and mass layoffs. This contributes to the "deindustrialization" of the American economy and reflects the destructive impact of corporate investment policies and federal fiscal, monetary, and trade practices.

Although workers in manufacturing make up about 40 percent of the victims of dislocation, workers in other industries like transportation, mining, wholesale trade, and telecommunications are also heavily affected.

Two out of every three dislocated workers are blue collar workers and one out of three is a white collar worker.

The heavy toll on dislocated workers includes:

* Job loss with unemployment averaging six months, with more than one-fifth of all dislocated workers remaining jobless for more than two years;

* Wage loss averaging 16 percent, with earnings losses of 30 percent for those required to switch occupations or industries to find new jobs.

These are not simply regional problems. In fact, the highest rates of worker dislocation from plant closings in 1981-1985 are in the South Central states and the lowest rates are in the so-called "rust belt" states of the Northeast and Midwest.

In many cases, injuries suffered by workers and their communities could be eased or avoided by timely government or private intervention.

Some plant closings and mass layoffs are preventable. Less than 10 percent of plant closings are due to bankruptcy or financial insolvency. And where a closing cannot be prevented, its disruptive effects can be minimized by a variety of readjustment measures.

No Employer Obligation

Under decisions of the Supreme Court and the National Labor Relations Board, most plant closing decisions are not mandatory subjects of bargaining.

This means employers are free to bypass collective bargaining in making decisions on plant closings. As a result, opportunities are lost to search for constructive alternatives to a plant closing or major layoff.

Employers also have no legal obligation to give advance notice of plant closings or mass layoff decisions to their workers. A majority of blue-collar workers get less than two weeks advance notice and one-third get no notice at all.

Task Force Report

The task force on plant closings and worker adjustment appointed by the Secretary of Labor concluded in its January 1987 report that:

Advance notice is "an essential component of a successful adjustment program;" there is no evidence to support business fears regarding notice; and serious problems of worker adjustment now occur because corporate management rarely gives advance notice.

Advance notice and consultation are no problem for most businesses. Many U.S. corporations agree to advance notice provisions in their union contracts. Many U.S. corporations operating in Europe and Canada routinely give advance notice and consult with affected workers and unions in compliance with the foreign host nations' laws.

The United States government has a responsibility to protect American workers and local communities against the devastating consequences of plant shutdowns and mass layoffs.

In Canada, where advance notice is required, an industrial adjustment service of the federal government has been effective in working with labor and management to cope with plant closing and worker adjustment problems.

Assistance for Workers

Advance notice and consultation make it possible for new solutions or alternatives to be examined before a plant closing or major layoff. Such procedures enable workers and employers and local communities to work out adjustment assistance for the parties involved before job loss occurs.

In many situations, consultation will not prevent a plant closing or major layoff. But if notice-consultation requirements prevent only a small part of all proposed closings and major layoffs, such requirements would be amply justified by the injuries avoided for workers and local communities.

The Reagan Administrtion is proposing $980 million for services to dislocated workers -- but only half of this amount is "new money" and the rest is to be taken from dismantling Trade Adjustment Assistance, federal aid for vocational education, and the dislocated workers program of the Job Training Partnership Act.

The AFL-CIO estimates $980 million is less than one-third of funds needed for workers assistance and the AFL-CIO is calling for enough "new money" to provide income support as well as employment and training services for dislocated workers.

Dislocation by State

About 12 million jobs were lost nation-wide -- 5 million from plant closings -- as a result of worker dislocation over a five-year period, according to surveys by the Bureau of Labor Statistics.

The five states with the highest rate of worker dislocation are West Virginia, Alaska, Washington, Mississippi, and Louisiana.

The table on page 3 of this report shows five-year job loss by state in actual numbers (thousands) of workers aged 20 years or more who permanently lost their jobs because of plant closing or a job or shift being abolished.

The table and the map are based on an Industrial Union Department research report averaging results from two five-year surveys (1979 to 1983 and 1981 to 1985) by the Bureau of Labor Statistics. On the map (page 4), the dislocation rate is presented as a percentage -- total job loss over the five-year average as a percent of employment in 1983.

AFL-CIO Objectives

To minimize the human costs of economic change and to cushion adjustment by workers and local communities, the AFL-CIO is calling for passage of federal plant closing legislation that provides:

* Mandatory advance notice of contemplated plant closings and mass layoffs, accompanied by disclosure of all relevant information related to the closing or layoff, and possible alternatives to such action.

* Consultation with labor and the community and access to government technical assistance to explore alternatives to closing and to plan assistance for workers and communities where a closing cannot be avoided.

* Compensation in the form of mandatory severance pay to workers who do not get advance notice or whose union is not offered an opportunity for consultation with respect to a contemplated closing or mass layoff decision.

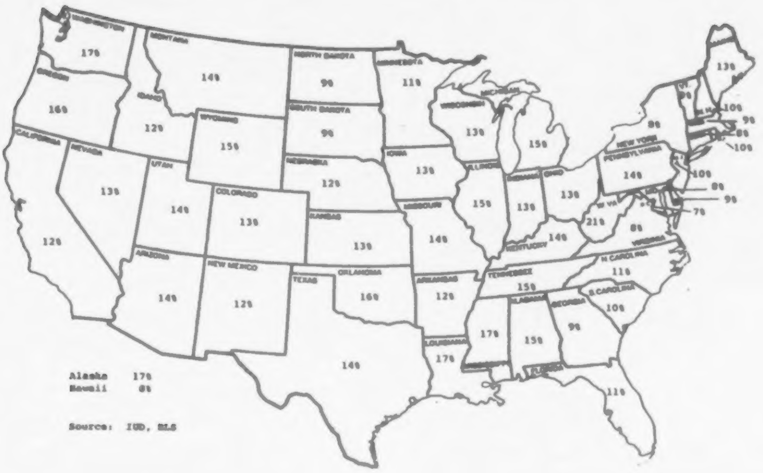
* An industrial assistance program on the Canadian model to provide rapid-response, plant-specific aid for dislocated workers, including job training with adequate income support during training; education and relocation assistance; and employment service assistance for job-related counseling, job search, and job placement.

Five-Year Job Loss by State
(in thousands)

State	Total Dislocation	Plant Closings
Alabama	219	111
Alaska	23	8
Arizona	161	69
Arkansas	103	48
California	1,269	561
Colorado	196	97
Connecticut	118	53
Delaware	23	9
D.C.	19	7
Florida	471	241
Georgia	207	96
Hawaii	32	16
Idaho	45	21
Illinois	678	262
Indiana	285	130
Iowa	154	64
Kansas	131	47
Kentucky	192	83
Louisiana	268	113
Maine	57	31
Maryland	155	67
Massachusetts	220	97
Michigan	511	227
Minnesota	211	90
Mississippi	151	66
Missouri	283	120
Montana	45	21
Nebraska	87	46
Nevada	52	22
New Hampshire	46	24
New Jersey	320	158
New Mexico	62	30
New York	536	243
North Carolina	271	123
North Dakota	25	11
Ohio	557	223
Oklahoma	206	76
Oregon	179	76
Pennsylvania	630	276
Rhode Island	40	21
South Carolina	129	58
South Dakota	26	11
Tennessee	273	111
Texas	889	392
Utah	80	38
Vermont	22	9
Virginia	202	88
Washington	295	122
Wisconsin	259	95
Wyoming	33	15
West Virginia	126	55
Total	11,600	5,100

WORKER DISLOCATION

The serious nature of worker dislocation is shown here by job loss state-by-state over a five-year period as a percent of 1983 employment.


WASHINGTON
17%
MONTANA
14%
NORTH DAKOTA
9%
MINNESOTA
11%
OREGON
16%
IDAHO
12%
SOUTH DAKOTA
9%
WYOMING
15%
WISCONSIN
13%
MICHIGAN
15%
13%
CALIFORNIA
12%
NEVADA
13%
UTAH
14%
COLORADO
13%
NEBRASKA
12%
IOWA
13%
ILLINOIS
15%
INDIANA
13%
OHIO
13%
NEW YORK
PENNSYLVANIA
14%
KANSAS
13%
MISSOURI
14%
KENTUCKY
14%
W VA
21%
VIRGINIA
8%
ARIZONA
14%
NEW MEXICO
12%
OKLAHOMA
16%
ARKANSAS
12%
TENNESSEE
15%
N CAROLINA
11%
S CAROLINA
10%
TEXAS
14%
LOUISIANA
17%
17%
ALABAMA
15%
GEORGIA
9%
FLORIDA
11%
10%
9%
8%
10%
10%
8%
9%
7%
Alaska 17%
Hawaii 8%

Source: IUD, BLS

AFL-CIO Supports S.538, H.R. 1122

Two key plant closing bills in Congress have the support of the AFL-CIO as introduced -- in the Senate, S.538 sponsored by Sen. Metzenbaum (D-OH), Sen. Kennedy (D-MA), and the other majority members of the Senate Labor Committee; and in the House of Representatives, H.R.1122 sponsored by Rep. Clay (D-MO), Rep. Ford (D-MI), Rep. Conte (R-MA), and other members of the House Labor Committee. The bills provide:

Advance Notice requirement --

-- 180 days notice to lay off permanently more than 500 workers;

-- 120 days notice to lay off permanently 101 to 500 workers;

-- 90 days notice to lay off permanently 50 to 100 workers.

Consultation requirement -- During the notice period the employer, on request, must meet with and discuss the decision to close or lay off with representatives of workers and local government. This does not prevent an employer from putting a plant closing or major layoff into effect.

Adjustment Assistance -- The bills authorize $980 million for worker adjustment assistance; set up a Dislocated Worker Unit in the U.S. Labor Department; require states to set up state Dislocated Worker Units and tripartite labor-business-public review committees.

The AFL-CIO urges action by the U.S. Congress on plant closing bills S.538 and H.R.1122.

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Roots of the TRADE CRISIS

The AFL-CIO has long been concerned with the effects of unregulated and discriminatory trade. Millions of workers have lost their jobs due to the absence of effective trade policies, the capriciousness of individual companies or the vagaries of U.S. economic policy. The fact that international trade can and has damaged U.S. domestic production is widely acknowledged—an understanding no doubt triggered by the fourfold increase in America's trade deficit in just six years. Those who in the past denied the existence of a problem or counseled patience to the victims of trade have been largely silenced by the enormity of the shift in U.S. trade patterns.

The question now is what to do about it.

Last spring, the House of Representatives addressed this national crisis by passing, by a vote of 295 to 115, comprehensive legislation entitled the Trade and International Economic Policy Reform Act of 1986. While not perfect, the House bill,

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This article was prepared by staff members of the AFL-CIO Dept. of Economic Research, including Assistant Director Arnold Cantor and Economist Mark Anderson.

among other things, required the gradual reduction of U.S. trade deficits with certain countries, introduced the concept of worker rights and trade, modernized and streamlined U.S. trade remedy law, and expanded the coverage of unfair trade practice statutes. Unfortunately, the Senate didn't act. This bill has been reintroduced in the new Congress (H.R. 3) and the Senate has also begun consideration of various trade reform proposals.

In all probability, trade legislation will be enacted in 1987. Whether it will be sufficient to this country's needs remains the key question.

TRADE AND THE U.S. ECONOMY

The U.S. trade deficit reached $170 billion last year, more than four times the 1980 total. Exports dropped slightly from 1980 to 1986, while imports mushroomed 51 percent.

Fuel imports put this country in the red during the late 1970s and early 1980s. But recently, manufacturing goods have accounted for the biggest chunk of the trade shortfall. Manufactured imports outpaced exports by about $145 billion last year, from an export surplus of $13 billion as recently as 1980.

The enormous U.S. trade deficit wiped out millions of jobs, devastated local communities, and pushed the U.S. economy into a risky, fragile condition. The trade gap has already made the U.S. the largest debtor in the world, placing a heavy burden on future generations, which are likely to have fewer good job opportunities and slower income growth.

The trade imbalance cost the United States 2.5 million jobs in 1986 alone. Saving those jobs would have meant a reduction in the unemployment rate from 7.0 percent to 5.0 percent.

Numerous well-paying and high-quality job opportunities in the middle tier of the nation's income structure are being forfeited, and with that, the living standard that made the U.S. the envy of the world is being undermined.

The impact on employment has been severe. The year 1986 was only one of ten post-World War II years with an unemployment rate above 7 percent, and six of those years were 1981 through 1986, the period when America's international trade position nosedived.

While total employment has grown in the last six years, that growth has taken place solely in service sectors. Employment in manufacturing has declined by some two million jobs. Further, even with the sharp growth in service industry employment, the rate of job growth in the last six years is 29 percent below average growth rates of the 1970s.

The upheaval within the manufacturing sector has been harsh and tempestuous, and imports are the source of most of the employment losses. Since peaking in 1979, the jobs in numerous manufacturing industries have plummeted. Among durable goods manufacturers, lumber, furniture, stone, primary and fabricated metals, machinery, motor vehicles and other transportation equipment have all suffered considerable job losses. In nondurables, employment is down from 1979 levels in food, tobacco, textile, apparel, paper, chemicals petroleum and leather.

In a study of displaced workers released in October 1986, the Bureau of Labor Statistics reported that between 1981 and 1986, years when the nation's trade deficit was growing dramatically, 13.1 million lost their jobs to plant closure, slack work or layoffs. More than five million of these displaced workers had been at their jobs for at least three years. Of these, the survey found that 18 percent remained unemployed and an additional 15 percent had left the workforce entirely. For those fortunate enough to find other jobs, 10 percent were working part-time, and of those securing full-time work, 40 percent were forced to accept lower pay. Not surprising, under that impact, average weekly earnings for U.S. non-supervisory production employees have declined about 9 percent from 1979 to 1986 after adjusting for inflation, and 60 percent of the new jobs created since 1979 paid less than $7,000 a year.

Many Lost Jobs Aren't Reflected In Employment Data

The officially reported net job changes in various industries do not capture all of the jobs lost or show the job opportunities that would have been available if the nation's trade balance were better. For example, given the growth in the nation's economy and the demand for various goods and services, if trade had been balanced and demands were satisfied to a greater extent by domestic production, many domestic industries that lost jobs would have had job increases, and industries that posted net employment additions would have enjoyed even greater increases. And there are indirect effects on sales, jobs, and incomes that reverberate throughout the economy.

Several organizations have studied these relationships and tried to trace the interconnections among industries involving trade, output, and employment. Such investigations uniformly demon-

Needed: 'Strong, Effective' Legislation

The following statement on trade was adopted by the AFL-CIO Executive Council, Feb. 16, 1987, at Bal Harbour, Fla.:

For the good of the country, and for the good of the international trading community, the 100th Congress must pass trade legislation that is based on a strong and effective trade deficit reduction provision. Such a provision must require any major trading partner that maintains excessive surpluses with the United States, and is found to engage in unfair trading practices, to reduce those surpluses.

The U.S. merchandise trade deficit amounted to $170 billion in 1986, a four-fold increase from the 1980 level. Millions of jobs have been lost. No sector of the economy is untouched. Mines and factories are closing, communities are devastated, and more and more farm families are being driven off their land. The dramatic increase in imports has been accompanied by massive inflows of foreign capital. America's future is mortgaged to the hilt.

More than 70 percent of the trade deficit is accounted for by imbalances with just five countries—Japan, $59 billion; Canada, $23 billion; Germany, $16 billion; Taiwan, $16 billion; and South Korea, $7 billion.

Some of these countries have refused to open their markets and abolish their unfair trading practices as a step toward reducing their huge surpluses. Where their focus has been on mercantilistic policies that depend upon export-led growth, that focus must be changed to policies that increase the purchasing power of their own people.

A strong trade deficit reduction provision is essential to give these countries the incentive to do what needs to be done to improve the lives of their own citizens and the citizens of their trading partners.

The prescriptions of the Administration—falling dollar exchange rates, multilateral negotiations, and selective action against unfair trading practices—have not, and will not, significantly reduce the trade deficit.

The Congress must send to the President a trade bill that will reduce the trade deficit and help American workers and industry regain lost production, jobs and income.

The AFL-CIO supports H.R. 3 in the House of Representatives as a constructive beginning to overcome the trade crisis. We are disturbed, however, that proposals advanced by the Chairman of the Senate Finance Committee fail to meet this test.

In addition to deficit reduction, the AFL-CIO supports legislation that will:

- Make the denial of internationally recognized worker rights an actionable practice under U.S. trade law. The U.S. should not permit free entry of goods produced in countries which refuse to respect basic worker rights.
- Expand trade adjustment assistance both in coverage and scope, financed by an import surcharge, to help those workers harmed by trade.
- Tighten and streamline the U.S. trade law to make relief from injury timely, effective, and predictable and to counteract unfair trading practices.
- Remove from both the tax and tariff codes incentives for the movement of U.S. production overseas, one of the major sources of the trade deficit.
- Deal with the problems of specific industries such as textile and apparel, shoes, telecommunications, printing, maritime and steel.
- Begin addressing the problem of less-developed country debt by requiring partial forgiveness by the lending banks of the principal owed, as well as reductions in interest rates.

The AFL-CIO will work with the Congress to achieve effective trade legislation.

The AFL-CIO will not support, and will oppose, purely cosmetic trade legislation that does not address these vital points.

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strate that the nation's trade deficit has had significant adverse effects on employment and production and that manufacturing industries and the regions dependent on manufacturing have suffered the most.

One detailed evaluation of employment impacts, based on the experience in 1984, was published by the U.S. Dept. of Commerce in January 1986. The United States suffered a $123 billion deficit in its merchandise trade in 1984. Using two different assumptions concerning the composition and size of the trade deficit, the Commerce Dept. estimated that employment was between 1.3 percent and 2.7 percent lower than it would have been if trade were balanced. This represents between 1.1 and 2.4 million jobs.

A third approach assessed trade within the context of the overall economic environment and yielded an estimated loss of 1.8 million jobs in 1984. This analysis assumed that the United States would undertake policies to bring about a trade balance. These policies included negotiations with other nations to reduce trade barriers and unfair trade practices along with agreements that key trading partners would implement government spending, tax, and monetary measures to boost their economies. The additional element in this phase of the Commerce Dept.'s analysis was the allowance for the feedback from such factors as interest rates and inflation when the pace of the economy quickened because of the trade deficit's decline. Simultaneously, employment and output were traced through the nation's industrial structure, as in the department's two other analyses.

Updating these estimates to 1986 to account for the 40 percent deterioration in the nation's trade balance over the last two years indicates that the United States had 2.5 million fewer jobs because of the trade deficit in 1986. The jobs shortfall in manufacturing was heaviest in the following industries: textiles, 631,000; electrical and electronic equipment, 475,000; the three metal industries combined (primary iron and steel, primary nonferrous, and fabricated metal products), 342,000; leather and leather products, 208,000; and motor vehicles, 171,000.

As is to be expected, the regions where trade-sensitive manufacturing industries are located have experienced the largest numbers of lost jobs. However, the damage has by no means been limited to the northeastern and midwestern industrial belt. Data Resources, Inc. (DRI), a private economic consulting organization, evaluated trade's influence on the nation's regional employment patterns in 1984. DRI found that many large industrial states, including Pennsylvania, Michigan, Ohio, and New York have had huge numbers of jobs evaporate because of the adverse effects of imports. But, when states are ranked by their job loss percentage, several Sunbelt states, including South Carolina, North Carolina, Georgia, Alabama, New Mexico, and Mississippi also show severe job losses.

TRADE BY COUNTRY AND SECTOR

The United States is running its biggest merchandise and manufacturing trade deficits with Japan. Imports from that country alone account for about $59 billion of the 1986 trade deficit of $170 billion. Japanese goods imported by the United States—almost all of them manufactured goods—increased by more than two-and-one-half times from 1980 to 1986 when measured in U.S. dollars.

But the United States is running large trade deficits with several other countries. In fact, more than 70 percent of the trade deficit is accounted for by imbalances with just five countries—Japan, $59 billion; Canada, $23 billion; Germany, $16 billion; Taiwan, $16 billion; and South Korea, $7 billion.

Unlike the United States, most other countries have taken strong action to aid their domestic industries through import restrictions, export promotion, and a variety of "industrial policies."

Some countries apply trade barriers, such as import charges and quantitative restrictions, on goods from the United States and elsewhere. Some subsidize their exports and "dump" their products here and elsewhere to capture markets. And a number of countries ignore patents and copyrights designed to protect imported goods from unfair imitation.

Japan employs a number of trade practices to discourage imports and spur exports. That nation imposes tariffs and other import charges on agricultural products, wood and paper products, cigarettes, and aluminum. For wood and paper products alone, the United States could increase exports to Japan by more than $500 million if Japan's tariffs were reduced to U.S. levels.

Japan also imposes non-tariff barriers such as discriminatory standards and elaborate testing, labeling, and certification of imported goods. These practices affect imports of telecommunications equipment, pharmaceuticals, medical equipment, and autos, to name a few. For example, each automobile imported into Japan must be individually inspected in contrast to the U.S. practice of examining a few sample cars. Last year, Japan exported more than 2.3 million cars to the United States. Meanwhile, only about 2,500 U.S. autos made it into Japan.

Other barriers include patent and trademark registration delays in Japan that deter U.S. firms from introducing their products into that country for fear of imitation. Until recently, the containers that U.S. shippers commonly use were banned from Japanese freeways, forcing the packing, unpacking, and repacking of many U.S. imports. And Japan ardently protects its agricultural industry, virtually forbidding rice imports, for example, even though Japanese rice costs around six times more than high quality California rice.

Nations of the European Economic Community (EEC) also run substantial trade surpluses with the United States and follow practices that encourage exports and limit imports for a wide range of products from different countries.

France uses massive export subsidies. In many cases, the subsidies are granted when countries place large orders for French goods, thus encouraging the sale of French goods abroad and hampering U.S. exporters that compete with France in those countries. In Germany, the Deutsches Bundespost agency responsible for the purchase of about 80 percent of that country's telecommunications equipment discriminates against non-German companies through testing and certification practices and requirements that manufacturers maintain facilities in Germany. And the European Community as a whole severely restricts agricultural imports from the U.S. and elsewhere.

Newly industrialized countries also have adopted trade practices favoring their own businesses. Brazil, for example, uses an extensive system of import controls. Total imports of Brazil in 1985 amounted to less than 6 percent of that country's gross domestic product—or 3 percent if oil imports are excluded. In contrast, U.S. imports amounted to 31 percent of this country's gross domestic product.

Brazilian law restricts the importation of goods that can be made in Brazil, and the country's licensing requirements and quantitative restrictions effectively exclude imports of U.S.-made goods. Without these restrictions, U.S. exports of textile and apparel to Brazil would average about $100 million a year, according to a report from the U.S. Trade Representative. With them, such exports amounted to less than $12 million in 1985.

Korea, which exports clothing, telecommunications and audio equipment, footwear, electrical equipment, and automobiles to the United States, imposes quotas on many U.S. agricultural and food products as well as a range of manufactured goods.

Imports have hurt a whole range of U.S. manufacturing industries. Auto imports are expected to total 4.7 million units in 1986, or 40 percent of the U.S. market. Steel imports have climbed 35 percent in volume from 1980 to 20.9 billion tons in 1986.

Imports of clothing and textiles rose more than 250 percent in dollar terms from 1980 to 1986. Shoe imports, too, have skyrocketed during that period. And the U.S. trade balance for telephone and telegraph equipment fell from a $136 million surplus in 1980 to a $1.3 billion deficit last year.

In 1980, the value of manufactured imports equaled 23 percent of the value of all such goods made in the USA. By 1985 their value was almost one-third that of U.S. manufactured goods. Meanwhile, the share of U.S. manufactured goods exported fell from 25 percent in 1980 to 18 percent in 1985. Given last year's trade deficit, 1986 levels undoubtedly will be worse.

Agriculture and High-Tech

For a time, some economists and policymakers counted on U.S. exports of agricultural products, high technology and business services to keep the trade flows in balance. They were wrong.

The United States, long considered the bread basket of the world, exported one-third fewer agicultural products last year than it did in 1980. The U.S. agricultural trade surplus has plummeted from about $23 billion to about $3 billion over that period. Many factors were involved, including the overvalued dollar, better agricultural yields abroad, and aggressive export policies of other countries selling to nations which previously bought from the United States.

A similar shift has occurred in U.S. trade of high-tech goods. The 1985 U.S. trade surplus of $3.6 billion for these goods is expected to became a deficit of $3.6 billion for 1986, a startling switch from a U.S. high-tech surplus of $26.7 billion in 1980. The United States is in the red to the tune of $18 billion for high-tech trade in communications equipment and electronic components, $2.8 billion for professional and scientific instruments and more than $800 million for engines, turbines and parts.

Comparisons of 1980 and 1986 high-tech sales show a two-thirds drop in the U.S. trade surplus for accounting, computing and office machinery—including computers—a one-third drop in the surplus for plastics, and another drop of almost one-third for drugs and medicines.

U.S. INTERNATIONAL FINANCIAL RELATIONS AND TRADE

Related to the sharp drop in America's international trade position is the fact that America doesn't just buy imports, we also borrow a lot of money to pay for those imports.

In the 1980s, the United States has gone from being the largest creditor nation in the world to the largest debtor. The United States and its citizens owe approximately $300 billion to foreign governments, corporations, banks, and individuals. Someday that money must be paid back; in the meantime, we are saddled with huge interest payments.

Current Account

Since 1976, the United States has had a merchandise trade deficit each year. But it didn't go into debt until 1982 because the investment income flow, plus income from services abroad by U.S. companies and citizens, outweighed the negative balances in trade, travel and transportation, and remittances abroad on pensions and other transfers.

However, starting in 1982, and in every year since, the trade imbalance overwhelmed the investment flow, and the U.S. balance on current account was negative, with the gap growing rapidly from year to year.

The current account deficits had to be made up by borrowing from other nations, and at the same time, the United States had to finance a huge and growing federal budget deficit. Foreigners rapidly increased their holdings of U.S. Treasury securities, helping to finance the budget deficit, and increased their direct investments in the United States by establishing and purchasing U.S. firms; by purchasing real estate, bonds, and corporate stocks; and by loans to U.S. companies. As the net investment position of the United States declined and that of foreign investors increased, the outflow of payments in the form of interest, dividends, and profits to foreigners advanced as loans and equity investments grew. This culminated in the United States becoming a net debtor nation in the amount of $107 billion in 1985 and $256 billion in the third quarter of 1986. Expectations are that the growth of the payments from the United States to foreigners in the form of interest, dividends, and profits will accelerate, enlarging the U.S. net debtor position to $800 billion by 1990.

This process will not go on indefinitely. Foreign lenders and investors will sooner or later lose confidence in U.S. investments or in the value of the dollar, which will decline as the U.S. economy slows and large trade deficits continue. Foreign creditors will then begin to draw back from U.S. loans and investments. If they sell off large amounts of U.S. securities, interest rates in the United States will rise, triggering a recession.

“The United States has gone from being the largest creditor nation in the world to the largest debtor. . . . Someday that money must be paid back. . . .”

EXCHANGE RATES AND TRADE

In the 1980s the United States experienced an extraordinary rise and fall in the foreign exchange value of the dollar. The dollar rose 87 percent against other major currencies in less than five years—July 1980 to February 1985—then dropped a sharp 40 percent over the two years since February 1985. Imports into the United States climbed drastically in the first period when a high-valued dollar could buy more foreign goods, but instead of declining as the dollar declined, our trade deficit deteriorated dramatically from $123 billion in 1984 to $170 billion in 1986, the worst level ever recorded.

Exchange rates do influence the nation's trade patterns, but these recent experiences demonstrate that many other factors are at play.

The Volatile and Complex Nature Of Exchange Rate Movements

One reason for the dollar's sharp ascent during the initial years of this decade was the high level of real interest rates in the United States beginning in 1981. It's no coincidence that the U.S. economy plunged into the worst recession of the post-war era at the same time that real rates (i.e., interest rates minus inflation) climbed sharply in 1981. The 1981 tax giveaway, along with tight money, raised real rates in the United States and attracted huge capital flows from abroad, pushing the dollar up. During the past two years, the sluggish pace of the nation's economy—in large part the result of the trade deficit's heavy burden—has tended to lower interest rates and, along with numerous other factors, contributed to the dollar's decline.

While exchange rates are one of many elements that can affect exports and imports, exports and imports themselves can also feed back to exchange rates with a reverse influence. A strong currency, for example, tends to make a nation's goods more expensive, which may worsen a country's trade balance. If the trade balance does deteriorate, the need for currency for trade purposes will decline, which, barring other factors, tends to make the currency cheaper.

Another feedback from the exchange rate—price changes—tends to reinforce that movement. A stronger dollar usually means cheaper imports, which contribute to inflation's slowdown. This slowdown may have added momentum to the dollar's upward climb. First, the dollar may have appreciated further to reflect inflation's moderation in the United States relative to other nations. Another way that inflation's moderation may have boosted the dollar was by keeping real interest rates in the United States higher than they would have been, offsetting some of the interest rate reduction stemming from the inflow of foreign capital.

Perceptions of political stability, risk, and other subjective considerations also affect rates of exchange, and speculation generates violent movements in currency values that frequently overwhelm the influence of more fundamental factors.

Both money and goods now move across national boundaries to a much greater degree than ever before. This increased interrelationship among the economies of different nations means that one nation's actions to influence exchange rates can be negated by developments in other countries. Thus, while an improved balance between the nation's monetary and fiscal policies (i.e., lower interest rates and lower federal budget deficits) might bring about a desired realignment of exchange rates, that is by no means guaranteed.

The elements that influence exchange rates are difficult to sort out, and the connection from exchange rates to trade is tenuous. Contributing to this complexity are delays in adjusting buying and selling patterns to movements in exchange rates; pricing and business location strategies designed to offset currency fluctuations; the wide variation of changes in the dollar's value against the currencies of different countries; the use of subsidies, dumping and other tactics to offset exchange rate movements; the extremely low wage levels in many countries; differences in countries' growth rates; and the global debt problem with related adjustment programs that limit imports from the United States.

While the dollar has declined against the mark, the yen, and the currencies of some other major trading partners, it has not declined against many of other major currencies such as those of Korea, Taiwan and many Latin American countries. Many of the countries in East Asia and Latin America link their currencies to the U.S. dollar, and with cheap labor and more competitive currencies, they are displacing Japan as a source of machine tools, cars, steel, and electronics.

Even against currencies of those countries most heavily involved in trade with the United States, the weakening of the U.S. dollar has not been universal. Canada, for example, has traditionally been the United States' most important trading partner in terms of total exports and imports. While Japan surpassed Canada as the largest exporter into the U.S. market in 1985, Canada is still the largest market for U.S. exports, has the largest combined volume of exports and imports with the United States, and retains its ranking as the country with which the U.S. has its second largest trade deficit—up from $20 billion in 1984 to $23 billion in 1986.

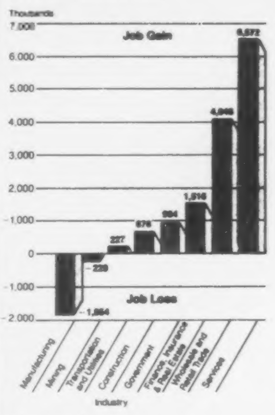
The U.S. dollar advanced 17 percent against the Canadian dollar from July 1980 to February 1985, when it reached its overall peak against other currencies. But over the past two years, in a departure from the general trend, the U.S. dollar didn't weaken against that of Canada.

The newly industrializing countries in Asia—South Korea, Taiwan, Hong Kong, Singapore, Malaysia—have been singularly successful in keeping their currencies cheap against the dollar, in contrast to the general trend of the past couple of years. Using Korea as an example, from 1980 through 1986 the dollar appreciated 46 percent against the won, and even advanced 4 percent between 1985 and 1986. Only during the dollar's sharp drop in recent months has the won advanced slightly. With its cheap labor and more competitive currencies, Korea is displacing Japan as a source of manufactured imports.

The dollar's decline against a foreign currency means that one dollar buys fewer units of that currency. This translates into a higher dollar price for foreign goods, unless the foreign price is reduced to offset the change in currency values.

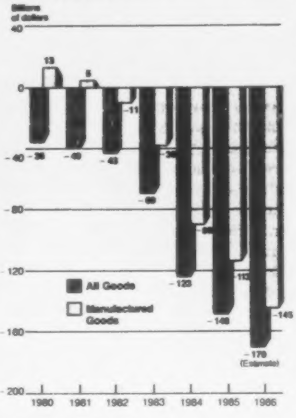
Import and export patterns may adjust to these currency changes, however, only after a significant time. Moreover, some circumstances and counterac-

Employment Change by Industry, 1979 to January 1987



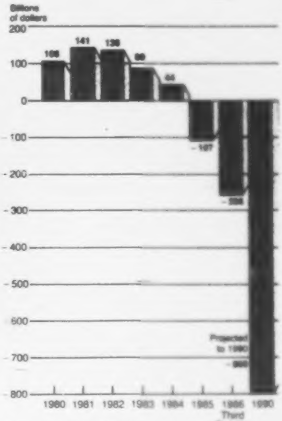
Source: Bureau of Labor Statistics

U.S. Trade Deficit All Goods and Manufactured Goods



Source: U.S. Department of Commerce

The Net Foreign Debt of the U.S.



Source: Department of Commerce

tive strategies may prevent such adjustment from ever taking place. Many orders are already in the pipeline and cannot or will not be cancelled. Long-term buyer and seller relationships have been established that aren't readily terminated. Since the quantity of U.S. imports doesn't respond to the higher dollar price right away, when the dollar's foreign exchange value falls, the dollar value of imports initially increases and the U.S. trade balance worsens. Such deterioration can go on for a long time if import purchasers don't respond much to higher import prices.

Further, numerous foreign producers have cut their prices to offset some or all of the effect of the weaker dollar. Such a strategy can keep their goods competitive in U.S. markets even though the dollar has weakened and their currencies have become dearer. While this reduces profit margins, many still have substantial leeway to earn a satisfactory return. This is because when the dollar rose earlier, many foreign producers didn't reduce prices in the United States as much as warranted by the dollar's increase, which fattened their profit margins.

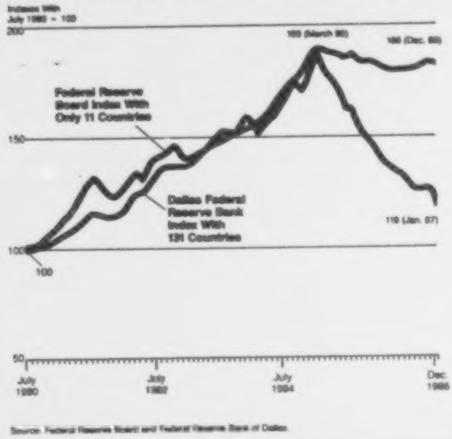
Businesses in a country experiencing an exchange rate appreciation can also switch production to locations with lower costs. Japanese companies, for example, have established or relocated facilities in Taiwan to maintain their ability to export goods to the United States. Taiwan's currency didn't strengthen in terms of U.S. dollars as did Japanese yen, and Taiwan's wages are also far below Japanese wages. Exploiting this opportunity allows Japanese firms to maintain or expand market shares in the U.S., even though the dollar has dropped against the yen.

In the period up to February 1985 when the dollar was strengthening against other currencies, many U.S.-based companies engaged in similar practices. That is, they moved or set up production facilities overseas in order to raise profits. Now that the dollar has weakened, however, no major reverse transfer of production facilities to the United States appears probable. Instead, the extreme volatility of exchange rates encourages businesses to keep plants overseas, or establish new facilities abroad, as insurance against future currency movements.

The conventional expectation is that after enough time elapses for buyers to respond to higher priced imports, the quantity of imports will drop and the trade balance will improve.

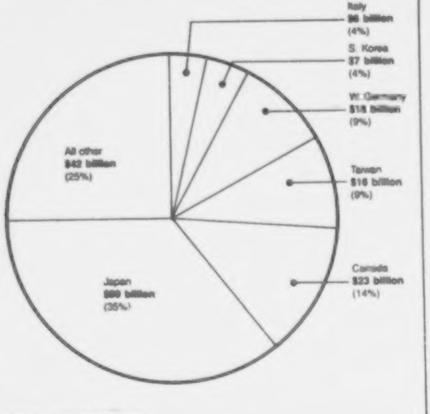
But the ever-increasing trade deficit during the dollar's two-year decline repudiates the idea that the nation can just wait for exchange rates to work their

Dollar Value Index With All 131 Trading Partners Shows Only a Slight Decline After an Enormous Rise



Source: Federal Reserve Board and Federal Reserve Bank of Dallas

U.S. Merchandise Trade Deficit by Country in 1986



Source: Department of Commerce

magic and solve the trade crisis. The mounting import excess demonstrates that the nation's trade crisis is a multidimensional problem and not just a function of exchange rates. Even when the trade deficit does diminish, the structural problems underlying much of the import surge will still need to be solved, and this will require a broad range of policy initiatives.

THIRD WORLD DEBT

The high debt levels of many Latin American and other countries combined with high interest rates have reduced their ability to buy American goods and increased their need to acquire dollars through exports to the United States. In fact, the combination of huge debt service requirements together with capital flight and policies that restrict growth has forced these countries deeper and deeper into debt. The World Bank reports that the total debt of developing countries has risen from $632 billion in 1980 to an estimated $1,010 billion in 1986.

One result has been a deteriorating U.S. trade balance with these nations. The U.S. trade balance with the largest Latin American countries has gone from a surplus of $5 billion in 1980 to a deficit of $16 billion in 1985.

The combined long-term debt of these same Latin American countries has increased from $292 billion at the end of 1982 to $333 billion at the end of 1985. For 1985 the average debt service-to-exports ratio for the seven major countries was 37 percent. Since their debt is mostly in adjustable rate loans, a sharp rise in U.S. interest rates, which would be transmitted to international financial markets, could lead to a virtual embargo on imports by the less developed countries and a further shrinkage of the market for U.S. goods.

The financial rescue packages put together by the International Monetary Fund (IMF) and other lending consortia have generally contained conditions that have further restricted trade, hurting workers in both the Third World and the United States. These loan packages have included requirements that debtor countries reduce government expenditures and restrict imports from the United States and other countries. Secondly, the developing countries have been forced by the IMF to expand their exports in order to obtain enough foreign currency to meet their debt service payments. This has been accomplished in part through a program of export-industry subsidization and other incentives that amount to "buying" a larger world share for their products.

These short-run solutions following the dictates of the banks and the IMF distort economic development. They generally come at the expense of production of basic domestically needed goods and domestic living standards and are the root cause of much political instability.

AMERICAN PRODUCTIVITY

Despite a lot of popular misconceptions, the U.S. produces more goods and services per worker and per hour than any other major industrialized country in the world.

In 1985, U.S. workers and industries were one-third more productive than their counterparts in Japan and the United Kingdom, and one-quarter more than the Italians, according to the U.S. Bureau of Labor Statistics. Productivity levels in West Germany and France came closest to those in the United States but still trailed by 7 percent.

The U.S. advantage over Japan is even greater when productivity is measured in terms of hours worked rather than number of employees. Measurements of production per hour show U.S. productivity levels two-thirds higher than those of Japan, according to estimates from the American Productivity Center.

U.S. Lead in Manufacturing Productivity

International productivity comparisons just for the manufacturing sector are difficult and no official government agency produces such data. Trade patterns, currency flows and interest rates all complicate attempts to make credible comparisons between countries. Despite this difficulty, rough estimates of manufacturing productivity per hour show the U.S. leading Great Britain by 100-percent, Canada by one-third, Germany by one-quarter and Japan by 9 percent.

Often the nation's productivity performance is confused by growth rates rather than with actual levels of production per worker. Japan currently enjoys the fastest growth in the rate of productivity increase of any major industrialized country, at 2.9 percent per year from 1980-85. Productivity in West Germany grew at a rate of 1.9 percent per year and in France at 1.5 percent. U.S. productivity growth trailed behind at 1 percent per year, but U.S. productivity levels still are superior.

Because U.S. workers produce more per hour than workers elsewhere, they can be paid more to reflect this without threatening U.S. competitiveness. The dramatic overvaluation of the U.S. dollar exaggerated wage and production cost differences between industries in the United States and in other countries. Also, to credibly compare wage rates among nations, the percent of labor costs compared to other production costs must be known.

The dollar's climb to its high mark in 1985 put U.S. wages at twice those of Japanese workers paid in yen. French wages were just 60 percent and West German wages 75 percent of those in the United States. The recent drop in the value of the dollar has narrowed the gap considerably. The International Monetary Fund reports a 30 percent drop from first quarter 1985 to second quarter 1986 in the ratio of unit labor costs in the United States to a trade-weighted average of unit labor costs in other industrial countries measured in U.S. dollars. The strong yen has moved Japan's wage level to a par with the U.S. level, and France's wage level is at 90 percent of the United States. West Germany's wage level is now 23 percent higher than our own.

"In sum, the deterioration of international cost competitiveness in U.S. manufacturing during the first half of this decade was the result of the real appreciation of the dollar, not sagging productivity growth or excessive wage increases," says the 1987 Economic Report of the President. The report also notes, "As the result of restrained wage increases and strong productivity growth, unit labor costs in manufacturing . . . have actually declined at an average annual rate of 0.8 percent since the recession trough in the fourth quarter of 1982." Meanwhile, the U.S. manufacturing trade deficit grew worse by a factor of more than four.

WORKER RIGHTS

The fundamental purpose of trade is to raise living standards and expand purchasing power. Practices such as subsidies or dumping, which give countries an unfair advantage at the expense of their trading partners are contrary to the goals of trade as are the even more predatory practices of low wages, oppressive working conditions, and the denial of worker rights. These practices depress the growth of domestic markets, making economies more dependent on exports which in turn undercut the living standards of American and other workers, and destroy the purchasing power that's essential to progress among the trading nations.

Unfortunately, many of the countries that have access to American markets and enjoy large trade surpluses regularly and actively deny their workers the right to join together for collective action to secure decent pay and working conditions.

Worker rights are formally recognized in the conventions adopted by the International Labor Organization (ILO). These ILO conventions offer labor unions worldwide at least some standard against which to measure their own advances. ILO standards say for example that workers have the right to create and join unions, draw up their own union rules, elect their own leaders, develop their own programs, or make their own affiliations with national or international organizations if they wish. Current ILO standards also call for a 40-hour week, generally set the age limits of child labor at 15 and provide for extensive recommendations on mechanisms for preventing work place accidents and work-related illnesses. Respect for the dignity of work and workers is the only way to produce a level playing field in international trade relations.

The AFL-CIO has sought to require that our trading partners respect worker rights as a condition of aid and access to American markets. The trade bill passed by the House of Representatives in 1986 designated the denial of worker rights as an unfair trade practice and authorized the President to take countermeasures against governments failing to provide such rights.

Already in law, both the Generalized System of Preferences (GSP) and the Overseas Private Investment Corporation (OPIC), explicitly link labor standards to eligibility for trade and investment benefits. Specifically, internationally recognized worker rights as defined by GSP and OPIC are:

- The right of association;
- The right to organize and bargain collectively;
- A prohibition on the use of any form of forced or compulsory labor;
- A minimum age for the employment of children; and
- Acceptable conditions of work with respect to minimum wages, hours of work, and acceptable safety and health.

When Congress renewed the GSP in 1984, providing continued duty-free treatment for many products from developing countries, a mandatory labor rights criterion was added. This required the President to withdraw GSP benefits from any country not taking steps to afford internationally recognized worker rights, such as the right to organize and bargain collectively, to workers in that country. Early this year, the Administration announced its decision that Romania and Nicaragua would be removed from GSP and that Paraguay's eligibility would be suspended for worker rights violations. Other countries, including Chile, Suriname, Taiwan, and South Korea, targeted by the AFL-CIO for removal from GSP on worker rights grounds, will continue to receive preferential access to the U.S. market because of the failure of the Administration to take action.

MULTINATIONALS

The unconstrained, self-directed actions of U.S.-based multinational corporations have been key factors in undermining America's position in world trade.

Corporations shift the production of goods out of the United States to take advantage of low wages, working conditions, labor standards, taxes, and currency values. These companies actively seek to shape the national policies that affect them and shift U.S. technology and production know-how (much of it paid for by U.S. taxpayers) to wherever the profits are greatest.

Multinational corporations in 1983 received 46 percent of all U.S. imports, with one-third of their imports shipped in by their own affiliates in foreign countries. In 1983, almost half of the global exports of American multinational corporations came from their production facilities outside of the United States.

American multinational companies' employees in other nations now account for 6.6 million or 26 percent of the total; and in manufacturing, foreign employment accounts for 4.8 million or 31 percent of the total employment of U.S. multinational manufacturing corporations.

Examples of multinational firms moving abroad are many. American Telephone & Telegraph stopped producing ordinary telephones at an equipment plant in Shreveport, La., throwing more than 1,000 people out of their jobs. At the same time, AT&T has opened a similar production facility in Singapore and the output from that plant will be admitted to the United States without restrictions.

Automakers are planning to buy massive numbers of foreign-made cars. Ford has opened a $500 million plant in Mexico that will produce vehicles for the American market. General Motors has a joint venture with Daewoo in Korea to produce cars for the United States. And Chrysler plans to join with a Taiwanese car company to build a subcompact car that would be exported to the United States.

The Commerce Dept. estimates that by 1988, the practice of American companies selling foreign-made cars will raise imports and cost 90,000 more jobs.

In many cases, American multinationals have cut back or ceased production of product lines, preferring to buy foreign-made goods and sell the products under the American company's name. Several American companies are buying video cameras, recorders, and other consumer electronic equipment from Japanese companies and putting the American brand name on them. A large computer firm sells two mainframes which it buys from Japan and gets the central processing circuitry—the "brain"—for its biggest mainframe from a Japanese manufacturer.

The lucrative tax breaks enjoyed by multinational corporations include the foreign tax credit and the ability to defer taxes on income from foreign subsidiaries.

The foreign tax credit is a major factor in encouraging foreign operations of U.S. multinational firms. When an American firm pays state and local corporate income taxes, those tax payments are "deducted" from the otherwise taxable income of the corporation when its U.S. corporate income tax is computed. The multinational's overseas income gets a much better deal from the U.S. government than income from within the United States since income taxes paid to governments abroad are credited dollar-for-dollar against the company's U.S. corporate income tax liability.

If the foreign tax rate exceeds the U.S. domestic rate for any foreign affiliate in any country, the surplus tax credits can, with some restrictions, be washed out against the income of another affiliate taxed in a host country with tax rates below the United States. Surplus credits can also be "carried over" to cover tax periods two years backward or five years forward.

U.S. taxes are also deferred on income earned overseas until the profits are returned to the United States. This is often defended as "only" an interest free loan from the U.S. Treasury. However, a large amount of foreign profits are not returned to the United States, but are instead reinvested in the overseas affiliates. Under tax deferral, these profits reinvested are not subject to U.S. taxation and the interest free loan is in effect never repaid.

Foreign governments also offer an array of tax incentives, including total tax free status to attract companies, and the U.S. government also helps the multinationals by underwriting insurance against the loss of foreign plants through expropriation and other risks.

Maquiladora Program

Renewed attention has recently been directed at the harmful effects of the maquiladora program—an arrangement whereby U.S. companies establish low-wage production facilities across the Mexican border. Late last year the Congress directed the Dept. of Commerce to end its sponsorship of a conference in Acapulco designed to promote increased investment by American firms in Mexico.

The Commerce Dept.'s promotional brochure for "Expo-Maquila" described the attraction of the maquiladora program rather succinctly, emphasizing: ". . . An even higher potential for profit . . . a highly trainable workforce . . . low cost foreign labor . . . duty free importation of equipment . . . U.S. customs laws (which) allow American parts and components to be exported, repaired, processed or assembled abroad and then imported back into the U.S. with duties paid only on the value added. . . ."

Mexican labor and tariff policies dovetail rather nicely, from the point of view of U.S.-based multinational corporations, with U.S. tax and tariff laws. The AFL-CIO has long opposed Sections 806 and 807 of the U.S. Tariff Code which permit the export and re-import arrangements described above. Although these tariff sections apply worldwide, they are used in a particularly effective way in the case of Mexico and the border program. These provisions give American-based multinationals cut-rate tariff treatment for products assembled "overseas," without the costs and difficulties normally associated with locating an assembly plant truly overseas.

According to the U.S. Commerce Dept., the number of maquiladora plants in Mexico has grown steadily from 300 in 1978 to about 760 in 1985, with employment of Mexican workers increasing from 80,000 to almost 300,000 during this period.

U.S.-based firms have invested almost $2 billion in these cross-border operations during the last decade. And, the American Chamber of Commerce of Mexico predicts that if the growth rate of the program continues at the existing pace, nearly one million Mexican workers will be employed at 1,000 plants by the mid-1990s.

American-based multinationals and even the U.S. and Mexican governments frequently argue that the maquiladora program helps to create and preserve U.S. jobs in so-called twin or companion plants on the U.S. side of the border. Experience, however, as well as common sense, shows this to be false. These foreign operations have had a devastating effect on U.S. jobs, American workers and their communities. The jobs of tens of thousands of U.S. workers have been moved to Mexico.

Although the governments of Mexico and the United States call the maquiladora program a "great success," the program has in fact done little to bring Mexico's industrial base into the 1980s, or to help its people escape from poverty. Wages are too low to significantly stimulate demand in Mexico's domestic marketplace, or to encourage the purchase of imports from other countries.

The multinationals, by buying labor cheap overseas and reselling products in the United States, are destroying the economic balance that helped to create and sustain the U.S. market. That balance was facilitated by a U.S. system that allowed workers to gain higher wages through collective bargaining as advanced technology was developed and yielded higher productivity. As workers received part of that productivity in higher wages, markets expanded and encouraged further investment and employment. Increased economies of scale then contributed to further productivity gains and permitted wage gains.

Many of the countries in which U.S. multinational corporations are locating new plants have hourly compensation costs for production workers in manufacturing—including wages and salaries, supplements, and employer payments for social security, and other employee benefit plans—which are significantly below those in the United States. Generally, the new plants include the latest production technology and equal or exceed in efficiency the older plants in the United States that have been shut down.

Summary of Gephardt Amendment

The trade reform bill the House of Representatives passed in April provides an effective means of reducing the nation's enormous trade deficit.

The approach the bill takes, of dealing with unfair trade practices on a case-by-case basis, isn't greatly different than present law. Experience has shown that it is not good enough. That's why unions are supporting the strengthening amendment that Rep. Richard A. Gephardt (D-Mo.) will offer.

These are its main provisions:

- The Gephardt Amendment would add a new part to Section 301 of the Trade Act to deal with countries that employ unfair trade practices to maintain excessive trade surpluses with the United States.
- The International Trade Commission, in any year that the U.S. trade deficit exceeded 1.5 percent of gross national product, would be required to determine whether any "major U.S. trading partner"—a country with more than $7 billion in trade with the U.S.—maintains an "excessive trade surplus" (ratio of U.S. imports to U.S. exports of 175 percent and a surplus of over $3 billion and a current account surplus).
- Within 30 days of this finding, the U.S. Trade Representative must determine whether any "excessive surplus" country maintains a pattern of unjustifiable, unreasonable or discriminatory trade policies or practices that contribute to that surplus.
- If this is determined, the country in question would be required to reduce its surplus 10 percent from the 1986 level by 1988, followed by a 10 percent reduction from the 1988 level by 1989, and so on. If a country ended its unfair trade practices or fell below any of the numerical standards noted above, the process would stop.
- Following the identification of a country, a negotiating period would be provided to seek an agreement that would eliminate the unfair trade practices or achieve the surplus reduction goals. If negotiations proved unsuccessful, the President would be required to take action (initially in May 1989) to achieve the surplus reduction goal.
- For example, if Japan were identified, it would be required to reduce its 1986 surplus of $58.8 billion to $52.9 billion in 1988, $47.6 billion in 1989, and $42.8 billion in 1990.
- The President could waive application of this provision if he determined that a country had balance of payments problems or debt problems or if enforcement would cause substantial harm to the U.S. economy. These waivers, however, could be overturned by Congress on a "fast track" basis.

Hourly Labor Costs
For Production Workers In Manufacturing
As a Percentage of U.S. Labor Costs

	1975	1980	1985
Brazil	15	16	10
Hong Kong	12	15	14
Korea	6	11	11
Taiwan	7	12	11
Mexico	32	30	16

Source: U.S. Dept. of Labor

The economic balance that sustained a growing market in the United States does not prevail in the global economy the way it is reshaped by the multinationals. The U.S. economy and its workers are being affected adversely.

Eventually, because of the lower levels of wages and economic imbalances, the multinationals will have to sell in a world market less affluent than when workers producing the products received a better share of the sales value of the product. Their sales volume, benefits of economies of scale, and profits will be reduced.

GOVERNMENT RESPONSES

Existing U.S. trade law, while providing some measures to deal with foreign trade practices, has failed to curb the injury to domestic industries and workers. Generally, the statute is divided into "unfair trade" and "fair trade" provisions. Insofar as unfair trade is concerned, the principal elements are the antidumping law, countervailing duty law, and Section 301 of the Trade Act of 1974 entitled "Enforcement of U.S. Rights under Trade Agreements and Response to Certain Foreign Practices." The major fair trade provision is Section 201 of the 1974 Trade Act, also known as the "escape clause."

Antidumping Law

Congress first passed the antidumping law in 1916 and has amended it a number of times, most recently in the Trade and Tariff Act of 1984. This statute provides for the imposition of duties when foreign merchandise is being "dumped" in the U.S. market and is injuring U.S. industry. Dumping refers to the practice of selling goods in export markets at prices lower than those charged for the same goods in the home market.

Antidumping investigations may be initiated by the Dept. of Commerce or through petition filed by an interested party. The investigation must show not only the unfair pricing practice but that the domestic industry has been materially injured. The remedy available is the imposition of duties equal to the margin of dumping. An antidumping code under the General Agreement on Tariff & Trade (GATT) was negotiated in the 1970s and came into force in 1980.

Summary of Investigations
Under Antidumping Law since January 1980

Petitions Received	365
Petitions Dismissed	14
Initiations	336
Suspensions of Investigations	6
Withdrawals of Petition	103
Final Antidumping Orders	74

Countervailing Duty Law

The countervailing duty law was first passed by Congress in 1897 and since then has been amended many times. Its purpose is to offset unfair competitive advantages that foreign producers might enjoy over U.S. producers as a result of government subsidies. Countervailing duty investigations may be initiated by the Dept. of Commerce or through petition filed by an interested party. The investigation must demonstrate that a subsidy exists and that U.S. domestic industry has been materially injured. The material injury standard is necessary only for those countries that are party to the GATT Subsidies Code which was negotiated in the 1970s and put into force in 1980. The remedy available is the imposition of duties equal to the net amount of the foreign subsidy.

Summary of Investigations
Under the Countervailing Duty Law
Since January 1980

Petitions Received	293
Petitions Dismissed	8
Initiations	282
Suspensions of Investigations	31
Withdrawals of Petition	84
Final Countervailing Duty Orders	74

Section 301

Section 301 of the 1974 Trade Act gives the President authority to take retaliatory action to (1) enforce U.S. rights under any trade agreement, and (2) respond to any action, policy or practice of a foreign country that is inconsistent with the provisions of, or otherwise denies, U.S. benefits under any trade agreement, or is unjustifiable, unreasonable, or discriminatory or burdens or restricts U.S. commerce. The word "unjustifiable" refers to practices that violate U.S. international legal rights. The word "unreasonable" refers to practices that are not necessarily illegal but are otherwise unfair or inequitable. Investigations under Section 301 may be begun by the U.S. Trade Representative or any interested party through petition. Remedies under Section 301 are open-ended and left to the President's discretion. Since January 1975 only seven cases have resulted in retaliatory action.

Section 201—The Escape Clause

The principal U.S. fair trade law is Section 201 of the 1974 Trade Act which provides temporary relief for U.S. firms and workers from injurious import competition. This provision is based on the recognition that economic harm could come to particular sectors of the economy through fairly traded imports and that it is appropriate public policy to minimize such injury. An investigation may be initiated by the President or the U.S. Trade Representative or through petition from an interested private sector group.

The International Trade Commission (ITC) conducts an investigation to determine whether the imports are a "substantial" cause or threat of serious injury to the domestic industry producing a like or similar product. Substantial is defined as a cause that is important and not less than any other cause. This is a more stringent standard than international agreements require. If the ITC determines that injury has occurred, it recommends to the President the type of relief necessary to remedy the injury including the imposition of tariffs or quotas.

The President can either accept, reject, or modify the ITC recommendation. All too frequently, the President has decided against providing relief to the injured industry.

Summary of Investigations Under Section 201 since January 1975

Investigations Completed	60
Negative ITC Determinations	27
Affirmative or Tied ITC Determinations	33
Investigations in Which President Provided Import Relief Other than Trade Adjustment Assistance	12

Exchange Rate Policies

The steep rise in the value of the dollar from 1980 to February 1985 contributed to America's trade problem, but the impact has been overstated. Even though the dollar has been in decline for almost two years, the trade deficit has worsened. While the dollar has dropped almost 40 percent against the yen and the mark, when it is measured against the currencies of the 25 countries from which the United States imports the most merchandise, it has declined less than 10 percent.

The clear and demonstrable need for comprehensive general economic policies, trade specific actions and congressional prodding for legislative action has caught the Administration's attention. Unfortunately, for the most part this has resulted in merely heightening the rhetoric and some token steps. Fundamentally, the Administration remains committed to rather benign policies of watching the dollar fall and hoping for a growing demand for U.S. exports from the nation's major trading partners. Increasing this nation's "competitiveness" is also prominent among the Administration's catchphrases.

Expansionary Economic Policies

The Administration's call for expansionary policies by the country's major trading partners, particularly Germany and Japan, is conceptually similar to relying on a depreciating dollar, but even weaker in its effect since it assumes that increased demand in these nations will mean increased demand for U.S. products. This assumption is not supported by the evidence. Between 1980 and 1985, real U.S. demand for goods and services increased by some 12 percent, with inflation-adjusted imports increasing 45 percent. During this same time period, the Japanese economy grew 21 percent, but total imports increased only 9 percent. Germany's economy grew 6 percent, and total imports rose 10 percent, while imports from the United States dropped 18 percent.

Both Germany and Japan maintain a huge worldwide trade surplus—$29 billion and $77 billion, respectively—and therefore have the capacity to substantially increase imports from the United States. Simple economic expansion, however, in the absence of other policy changes, will not automatically bring this about. Their policies concerning imports must change. This should be a goal of any U.S. trade bill.

Selective Actions

As to tougher Executive Branch action against harmful foreign trade practices, the Administration's rhetoric has risen noticeably. Some complaints raised by domestic industry apparently have been settled. The Administration has even initiated some unfair trade cases itself in an effort to prove that the United States was serious. The number and selection, however, leave something to be desired. For example, selling more insurance to Korea will not solve our trade problems, and the actual results of Japan's agreement on tobacco or pushing Brazil to open its markets for computers and related equipment have not yet been realized.

Trade Negotiations

The final piece of the Administration's policy has been the initiation of a new round of trade negotiations. But negotiations have not in the past provided the relief that is essential to the survival of trade-impacted industries and their workers in the United States.

Even if negotiations are successful, agreements take years and the damage is being done right now. Negotiations will not create or implement an effective national trade policy or reduce America's huge trade deficits.

The overwhelming priority given by the Administration to negotiations on services, agriculture and investment in the new round also diverts attention from the principal trade problem, which is the massive shift that has occurred in trade in the manufacturing sector and the resultant loss of employment. Emphasis on "liberalizing" trade in services, agriculture and investment flows will have little impact on this central issue. In fact, it could accelerate the deterioration of the domestic manufacturing sector if essential U.S. protections in the goods area are sacrificed as the price for reductions in barriers to services, agriculture and investment. Further, what may appear to some as "barriers" to service or agriculture trade or international investment are in fact proper and even essential social and economic policies in both the United States and foreign economies. Banking and insurance regulations, protections of personal privacy, immigration rules and restrictions, and standards for lawyers, doctors and accountants are but a few examples.

The unrestricted flows of services and investment may be important to certain corporate interests, this does not make it significant for the economy as a whole. Since to a large degree services must be produced where they are consumed, any U.S. employment gains from increases in service trade would be marginal. The growth of service sector employment domestically has been in areas unrelated to international trade. Similarly, negotiations aimed at easing restrictions on international investment will do little to promote domestic economic growth and employment.

Competitiveness

The Administration is also pushing the "competitiveness" notion—a catchphrase that unfortunately obscures more than it reveals. To many, improving the nation's international competitiveness implies wage cutting and similar schemes to heap the burden of trade injury on workers and their families, as well as a general lowering of their sights and living standards. The measures proposed by the President fall far short of the actions needed to trim the $170 billion trade deficit, while other parts of the Reagan program—budget cuts in elementary, secondary and higher education programs for example, and the promise of continued attempts to deregulate and decontrol—would impede progress.

Much of the economic decline in U.S. goods-producing industries and the huge trade deficit is caused by misguided economic policies and the failure to deal appropriately with the realities of international trade and investment—not by a sudden or chronic loss of U.S. competitive ability. This Administration refuses to face the fact that free trade exists only as an empty slogan and a theoretical abstraction. Other nations manipulate product prices and exchange rates and erect trade barriers in order to promote and protect their workers, industries, and communities.

What Must Be Done

A strong, effective trade deficit reduction measure that requires our major trading partners to reduce excess surpluses if they are engaging in unfair trade practices must be enacted, and the United States should not permit unlimited entry of goods produced in countries that do not respect basic worker rights. That legislation should also include adjustment assistance and injury relief, removal of existing tax and tariff incentives to U.S. industries to move abroad, and measures to deal with specific problems of particularly hard hit industries. We must also deal with debt problems of less-developed countries in a way that strengthens their economies and enhances the living standards of their citizens.

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Where Have All the Good Jobs Gone

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By Arnold Cantor and Frank Parente
AFL-CIO Department of Economic Research

SLOGANS CAN'T REPLACE ECONOMIC POLICY

The Reagan Republican Administration has failed to give America the economic prosperity it promised. Long on rhetoric and short on performance, this Administration has substituted slogans for substance and ignored important and far-reaching national problems. The mishandling of the nation's economy has led to deep recession, stagnation, continued high unemployment, increased poverty and reduced standards of living for many people.

- Unemployment is higher. The average national jobless rate was 8.3 percent in 1981-1985; up from 6.2 percent in the 1970s and 4.8 percent in the 1960s.
- Between 1980 and 1985, 7.8 million jobs were created, 5.7 million fewer than the 13.5 million created during the five years from 1975 to 1980.
- The average worker's weekly paycheck buys less than it did in 1980.
- There is a worsening maldistribution of wealth in the U.S. The incidence of poverty is higher and middle-income families have been badly squeezed.
- The Reagan-supported high interest rate policy which was supposed to curb inflation without causing a business slowdown didn't work. It created a deep and prolonged recession, throwing millions out of work, many permanently.
- The supply-side tax cuts of 1981 were touted as a means to large increases in private investment and economic growth. But they failed: Investment accounts for a smaller share of the economy in the 1980s than in the 1970s or 1960s.
- The nation's trade deficit, based on figures for the first 8 months of the year, will be at a record $175 billion in 1986.
- Yearly real growth of the Gross National Product since 1981 was only 2.3 percent, compared with 2.8 percent in the 1970s and 3.8 percent in the 1960s.
- Inflation has abated, but primarily because of the severe recession and consequent excess capacity, including high levels of joblessness. It is currently kept in check by a high jobless rate, the glut of oil, a huge trade imbalance and low plant utilization. The nation's factories are operating at 79.6 percent of capacity, which is below the annual rates for 1984 and 1985.

"Today, the purchase of a home is often possible only with a second income in the household."

- Productivity is weak. Productivity growth since the deep Reagan recession has been the lowest of any postwar recovery period. Productivity growth is essential to lasting improvements in wages and living standards. Over the past several years, the private economy has been weak, and productivity-raising public investments in research and development, infrastructure, and in education and training have been cut back sharply.

The economy is weak, growth is far too slow and uneven, with whole sectors and regions of the economy on the ropes. Many service industries are prospering, and many states along the East and West coasts are doing well. Regions and communities dependent on manufacturing, however, have been depressed by plant shutdowns and slowdowns.

Manufacturing has been hurt by the overvalued dollar, low-wage foreign competition and the lack of a national trade policy. The United States has 2 million fewer manufacturing jobs now than in 1979, with the hardest hit sectors in primary and fabricated metals, machinery, electrical and transportation manufacturing, textiles, apparel, food and the petroleum industry.

Areas dependent on timber, mining, agriculture and petroleum are currently in the doldrums, hurt by, among other things, the still-high value of the dollar and the recent fall in world oil prices. Farmers are facing the highest levels of bankruptcies since the 1930s.

The current level of unemployment in the U.S. is high by historical standards and is worse than it appears on the surface. Official counts omit discouraged workers who have stopped the futile search for jobs and part-time workers unable to secure full-time employment. While 8.3 million are officially jobless, another 6.7 million workers are discouraged or underemployed in part-time jobs.

Black and Hispanic workers have been hit particularly hard by the unemployment of the 1980s. Recent statistics show one in seven blacks and one in nine Hispanics are unemployed, compared with one in 17 whites. Almost 40 percent of America's black teenagers are unemployed.

The social and economic costs of all this unemployment have been staggering. The U.S. economy loses nearly $150 billion in unproduced goods and services each year for every percentage point of unemployment, while the federal treasury loses revenue and must spend billions for income assistance. Sustained unemployment increases suicide, murder, crime, stress-related disease and mental disorders.

As the number of Americans struggling with unemployment has risen, the support available to them has dropped. Only about one-third of the unemployed received unemployment compensation benefits in 1984 and 1985, compared to the one-half in 1980, and the two-thirds in 1976. Of the more than 1 million workers jobless for 27 weeks or more, only about 1 percent received benefits in 1986.

Many of today's unemployed are workers who have lost their jobs because of shutdowns, relocations, slack work or the elimination of jobs or shifts. Despite the economic recovery experienced in 1983 and 1984, about 1.4 million workers lost their jobs during that time because of plant closings or permanent layoffs, according to the General Accounting Office. The GAO found that 16,000 establishments with more than 50 employees were forced to close or lay off employees during 1983 and 1984. GAO estimates that an average of 2.3 million workers were dislocated annually between 1979 and 1984.

"Two out of three Americans out of work today get no unemployment benefits of any kind. America has 35 million citizens without health insurance."

Displacement will continue to idle productive workers and rob once-healthy communities of their economic base as long as the economy remains sluggish, the towering trade deficit continues and corporations emphasize short-term profits through financial manipulations rather than long-term economic growth. Many displaced workers face long stretches of unemployment, and even those who find new work often experience a sharp decline in wages. Displacement has disproportionately affected manufacturing workers, forcing many who once earned solid industrial wages to take much lower paying jobs in service and retail trade sectors.

The economy is stagnant and threatens to fall back into recession. The current economic slowdown is characterized by continued high unemployment, declining worker buying power, burgeoning deficits, deepening under-utilization of plants and decreasing investment in new plant and equipment.

The severe problems of the mushrooming trade deficit and massive budget deficits pose a severe threat to the long-term health of the economy.

The dramatic rise in imports during the Reagan Administration has been fueled by low wages in foreign countries and the high U.S. dollar, which has been supported by the government's high interest rate policy. The artificially high value of the dollar has encouraged a flood of imports and made American-made goods more expensive to overseas customers. Action taken to lower the dollar's value has been too little and too late.

The Administration has been unwilling to adopt positive government policies to deal with the economic dislocation and the loss of jobs caused by the trade deficit, simplistically labeling all such proposals "protectionist." Under the Administration's "free trade" policies, however, the $40 billion trade deficit of 1980 tripled to a record $149 billion in 1985, and a projected $175 billion in 1986, and the U.S. has shifted from a creditor to a debtor nation.

The federal debt has doubled from $1 trillion in 1981 to $2 trillion in 1986. The deficit, which amounted to a record $221 billion in 1986 alone, means that funds must be diverted from needed domestic programs in order to service the debt and pay for the ongoing defense buildup which is a priority of the Administration. The deficit also requires borrowing on a massive scale, which keeps upward pressure on interest rates. Tax reform passed by Congress in 1986 is beneficial in many respects but does nothing to address the deficit problem.

TRADE

The Reagan Republican Administration has left U.S. industries and American workers defenseless against an onslaught of imports spurred by foreign government practices and the U.S. economic policies. The consequences of the failure to adopt a strong and predictable trade policy are being felt in all sectors of the economy through plant closings, bankruptcies, farm foreclosures and recessionary unemployment levels.

In early 1986, as America was recording trade deficits that would have been unthinkable a few years ago, President Reagan said in his annual Economic Report of the President: "Our international trade policy rests firmly on the foundation of free and open markets. The benefits of free trade are well known: it generates more jobs, a more productive use of a nation's resources, more rapid innovation, and high standards of living both for this nation and its trading partners." The Council of Economic Advisers elaborated, saying that job losses in the industrial sector were simply the result of improved efficiency and high wages, and that anyone who suggested otherwise has "an inadequate understanding of the benefits of trade."

For the millions of workers whose jobs were lost to imports or declining exports, this explanation provides little comfort. The shoeworker knows she is not overpaid at $6 an hour. The semiconductor worker knows he was efficient, but was still replaced by foreign production.

Where are the jobs this policy claims to generate? Since World War II, America has had only 8 years with an unemployment rate above 7 percent, and six of those years were the years 1981 through 1986. The ninth will be 1986, as the Administration ignores trade policy in the name of "free and open" markets.

The Department of Commerce estimated in January 1986 that in 1984 alone, 2.3 million jobs in manufacturing were displaced by trade, with a net loss of 1.1 million for the economy as a whole. A Labor Department study of displaced workers showed that between 1979 and 1984, 11.5 million workers lost their jobs to plant closure, slack work or layoffs—years when our trade deficit was growing dramatically.

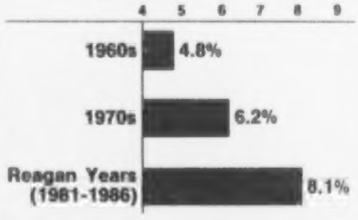
Similarly, the benefits derived by other countries from U.S. reliance on free trade bear careful scrutiny. Who, for example, gains from the assembly of electronic components in less developed countries? Not the worker who is frequently prohibited from organizing and bargaining collectively and is paid subsistence wages or less in an unhealthy or dangerous work environment.

The mystical dream world of "free trade" with which this Administration stands enchanted is a world that never was and never will be.

Where are the free and open markets on which President Reagan bases his trade policy? Do they exist in Japan, the European Community, Brazil, Taiwan or Mexico? Are free and open markets defined by quotas, stringent inspection requirements, discriminatory standards, export subsidies and incentives, industrial targeting programs, buy-national policies, export performance requirements, barter agreements and co-production requirements?

The dimensions of the problem are startling. The U.S. merchandise trade deficit in 1985 was 3½ times higher than in 1980. For manufactured goods alone, America has gone from a surplus of $12 billion in 1980 to a deficit last year that reached $113 billion. During this period, exports fell 2.5 percent, while imports of manufactured products shot up an astonishing 96 percent. In 1985, the import share of the U.S. market reached 50 percent for apparel, 23 percent for autos, 36 percent for machine tools, 25 percent for steel and more than 75 percent for shoes.

Average Unemployment Rates



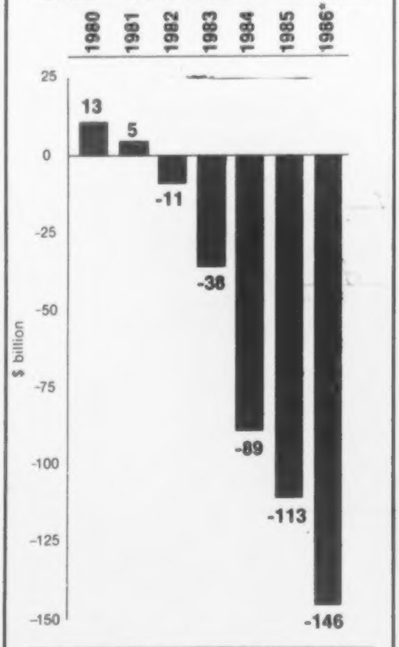
Averages based on U.S. Census Bureau Data published and analyzed by U.S. Department of Labor's Bureau of Labor Statistics. 1986 figure based on data through September

Trade deficits were experienced even in advanced products like semiconductors and telecommunications equipment. Through the first eight months of 1986, the deficit was running higher than in 1985 and had already reached $115 billion at a pace that will reach $175 billion by the end of the year, with manufactured goods accounting for $146 billion.

The Reagan Administration has steadfastly refused to act on this problem and is relying solely on the falling dollar exchange rates and multilateral trade negotiations to provide a solution. While the dollar has fallen significantly from its peak of February 1985, there has been little impact on trade flows. Further, much of America's problems are unrelated to exchange rate issues. For example, U.S. bilateral trade deficits grew substantially with countries like Taiwan and South Korea, which essentially tie their currencies to the United States. The U.S. bilateral trade deficit with Japan grew dramatically even though the dollar had appreciated only marginally against the yen. Trade negotiations will take five years at minimum and cannot be expected to provide immediate solutions to the trade crisis.

Changes in exchange rates or multilateral trade negotiations will not by themselves provide the solution to America's trade crisis. Changes in trade law and policy are urgently needed to provide predictable relief to industries and workers injured by imports; to mandate governmental action when U.S. commerce is negatively affected by unreasonable or discriminatory practices of foreign governments; and to require countries that enjoy unwarranted trade surpluses with the United States and maintain barriers to U.S. goods to begin to reduce those excessive surpluses.

U.S. Trade: The Deficit in Manufactured Goods



*1986 projection based on data through August. Source: U.S. Commerce Department

Trade legislation should include:

- Provisions to reduce unwarranted trade surpluses with the United States;
- Effective worker rights provisions;
- Trade law reform, providing more effective relief from injury by imports and protection from unfair trade practices;
- Adequate safeguards in any new round of trade negotiations.

In May 1986, the House of Representatives overwhelmingly passed comprehensive trade legislation that contained many of the elements essential to begin addressing the trade crisis. The Reagan Republican Administration is violently opposed to this needed bill, and the Republican-controlled Senate has so far been unwilling to consider similar legislation.

AMERICAN WORKERS AND THEIR JOBS

The Reagan Republican policies of the 1980s have contributed to a continued shortage of jobs, a shift away from basic industries and a rise in unemployment. They have resulted in income loss among those thrown out of work and a reduction in the living standards of those lucky enough still to have jobs. The terms and conditions of work have also been eroded. For many there is lower pay, less safety and health protection on the job and fewer worker rights.

America has undergone a dramatic shift in recent years. Since 1979, the United States has lost almost 2 million manufacturing jobs. They have been replaced by low-wage, low-skill jobs in "services"—wholesale and retail trade, finance, insurance, fast food franchises and the like.

Slow economic growth and the lack of a responsible trade policy have added to the problem of finding jobs for dislocated people and newcomers to the workforce, resulting in an increase in joblessness. Unemployment declined from the peaks of the deep Reagan Republican recession, but the jobless rate is still very high by historical standards and has not declined significantly in the last two years. It has hovered around 7 percent. In other words, after four years of economic expansion, working people are still experiencing recession levels of unemployment.

Some groups fare much worse than average. The national rate of unemployment masks the higher rates for the groups hardest hit by today's bad economic climate. In August, about one in six teenagers, one in seven blacks and one in ten women who maintain families was jobless. There were more than 3 1/2 million jobless adult men, almost 3 million jobless adult women seeking work and 1.5 million jobless teens.

Joblessness has resulted in great human suffering. Millions of American workers have lost their jobs because of plant closings and job shifts, spending long periods of time searching for work. In addition to the loss of self-esteem and feelings of self-worth, jobless workers have lost needed income and, in many cases, health insurance vital to meeting family needs. Two out of three Americans out of work today get no unemployment benefits of any kind. America has 35 million citizens without health insurance.

Even those still working have had a year-by-year decline in average real wages. Real spendable weekly earnings—earnings in dollars adjusted for inflation—fell from an average of $162 per week in 1979 to $148 in July of 1986. This kind of decline in income sharply erodes living standards and makes it necessary for families to tighten their belts and send more family members into the workforce.

Although most all categories of workers have been squeezed during the Reagan Administration, blue-collar production workers have had a particularly difficult time. The Employment Cost Index shows wage changes not adjusted for the effects of inflation and it shows that executives got substantially more than workers over the past six years. The wages and salaries for executive, administrative and managerial occupations have increased 28 percent since Reagan's election. Wages and salaries of clerical and administrative-support workers have increased 26 percent, and the wages of blue-collar workers have increased only 19 percent.

The impact of the Administration's trade, employment, fiscal, monetary and regulatory policies are nowhere more evident than at the collective bargaining table. Union workers have had to develop re-employment programs and shift to stock ownership, lump-sum payments and profit-sharing to deal with employment insecurity, foreign trade imbalances, the inflated value of the dollar and government-approved employer opposition to free collective bargaining. All of these factors have helped undermine collective bargaining settlements.

Although the Employment Cost Index fails to reflect all benefits being negotiated, like lump-sum payments, profit sharing, stock ownership, lifetime job guarantees and retraining plans, the index does point out that even represented workers are suffering under the Reagan Administration, although less than those without unions.

In mid-1981, union workers averaged $14.04 per hour in wages and benefits, and were at $9.56 per hour in wages alone. Nonunion workers were at $10.38 in wages and benefits and $7.66 in wages. Thus, in 1981, the typical union worker was earning 35 percent more than the average nonunion worker.

The union worker's position improved slightly in the next five years. In June 1986, union workers' wages and benefits averaged $17.79 per hour and $11.85 in wages—38 percent higher than the non-union worker's average of $12.87 in wages and bene-fits and $9.60 in wages.

Although union workers fared better than non-union, the fact remains that neither is keeping up with the cost of living and that working people are not getting a fair share of the nation's wealth.

Workers' needs for training and re-training are not being met. The Reagan budgets put employment and training very low on the list of national priorities. Federal funding of employment and training assistance has dropped from $9.5 billion in fiscal 1981 to $5.6 billion in fiscal 1986. The public service employment program, which provided needed work experience to those unable to enter the world of work, has been eliminated. Under the Job Training Partnership Act, emphasis is on helping the most job-ready, rather than on those most in need of training.

There has been a continuing attack by Reagan Republicans on the whole web of protections and regulations which foster worker rights and help assure decent wages.

The minimum wage has not been raised in more than five years. After adjusting for inflation, the minimum wage has fallen by 23 percent since January 1981 and is now at its lowest real level since 1955. The Reagan Republican Administration has attempted to further undercut the wage structure by advocating a sub-minimum wage for youth.

In the America of the fall of 1986, it took $5.39 an hour to get a family out of poverty, and about $13.50 an hour to reach what the government calls its "intermediate" standard of living for a family of four. Yet the minimum wage stood at $3.35 an hour, with no improvements voted since 1978, and the average U.S. wage earner earns $8.77 an hour.

The enforcement of health and safety regulations has gone down. The Occupational Safety and Health Administration's budget has declined since fiscal 1981 and personnel have been cut by 25 percent.

Many of the economic gains made by minorities and women over the last few decades have been curtailed or eliminated by the Reagan Republican Administration as a result of budget slashes, the destruction of social programs, crippling of employment and training programs, attacks on affirmative action and the weakening of equal employment opportunity law enforcement.

The National Labor Relations Board has modified the direction of key policies, undermining union organizing efforts and basic worker rights. The NLRB's case backlog has doubled from 1980 to 1986, effectively denying collective bargaining rights to increasing numbers of workers.

FEDERAL BUDGETS

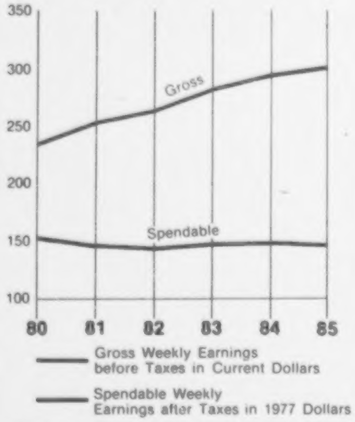
Over the course of the last few years, there has been a big shift in federal budget priorities. The Administration's massive, unfair 1981 tax cuts undercut the federal Treasury, leading to unprecedented annual deficits and a doubling of the national debt. If taxes had remained at their pre-1981 levels, the nation would have no budget deficit in 1986. The amount spent each year to pay interest on the debt has nearly tripled and military spending has doubled. If the 1980 share of the budget devoted to the military and interest on the debt prevailed in 1986, about $94 billion would be available for deficit reduction or other national needs.

These factors plus the economy's slow growth—with consequent losses in tax revenue—have increased pressure to slash domestic programs. Many effective and badly needed domestic programs have been ended or cut back sharply as a result.

The deficit problem is not going to go away. The Office of Management and Budget (OMB) in August reckoned the deficit for this year at more than $28 billion worse than had been thought in February. OMB figures the deficit to be $230 billion instead of the $202 billion previously thought, and worse than the fiscal 1985 record of $212 billion. The widening gap was due to an almost $12 billion shortfall in receipts because of the weak economy and an almost $16 billion jump in outlays, in part because of higher-than-expected payments for defense and farm price supports.

The fiscal 1987 budget resolution passed late in June by the Congress blunted the military buildup and rejected the Reagan request to further slash or end domestic programs. The resolution falls $15 billion to $20 billion short of the Gramm-Rudman-Hollings deficit law targets for 1987. Defense budget authority is $28 billion less than the Administration requested for 1987. Domestic programs are frozen or cut generally, except for selected priority programs like health and education, which would receive increases. The resolution also contains a contingency fund for unmet needs, if requested.

Stagnant Buying Power



	Gross	Spendable
1980	**$235.10**	**$151.65**
1981	**$255.20**	**$147.05**
1982	**$267.26**	**$145.77**
1983	**$280.70**	**$148.60**
1984	**$292.86**	**$149.96**
1985	**$299.09**	**$147.56**

Source: U.S. Department of Labor, Bureau of Labor Statistics. Spendable earnings for 1982 forward calculated by AFL-CIO using BLS methods.

> *"By focusing solely on the spending side of the budget, Gramm-Rudman-Hollings ignores the sensible and fair solutions—loophole closing, better enforcement and fairer income taxes."*

Congressional frustration with the mushrooming Reagan Republican deficits led to a senseless and unfair action: the automatic Gramm-Rudman-Hollings deficit reduction process. If enforced, it would arbitrarily and automatically cut programs across the board without regard to needs. By focusing solely on the spending side of the budget, it ignores the role of loophole closing, better enforcement and fairer income taxes in the deficit reduction process.

ECONOMIC DEVELOPMENT AND INFRASTRUCTURE

During the Reagan Republican years, programs to help local and regional economies grow and prosper have been constantly undercut. Federal aid for state and local governments, including assistance for job development, new business creation and infrastructure development, has gone down from almost 16 percent of the total federal budget to about 11 percent.

National job loss has been caused primarily by the high value of the dollar, low-wage foreign competition and the absence of a national trade policy. But economic dislocation in many areas has also been due to the problems of the domestic oil industry and agriculture. These developments have further weakened local economies by pulling down the businesses that depend on the affected industries, including banks and other firms.

The deregulation of the transportation industries has contributed to the erosion of many regions. Concentrating on more heavily traveled routes, deregulated transportation companies have cut back and even ended service for less populated areas. Businesses cannot survive in an area without reliable, frequent and affordable transportation. Bankruptcies ensue, new business cannot be attracted, population declines, and transportation-deprived regions deteriorate and often die. Because transportation affects not only direct users but the community and the nation as a whole, a strong government role is needed to ensure continued widespread access to service at affordable rates.

The nation's investment of jobs and capital in public facilities has failed to keep pace with needs. Roads, bridges, airports, railbeds, ports, waterways, water supply and wastewater treatment systems have deteriorated, and an important source of jobs has been overlooked.

To rebuild in four major areas—highways, bridges, urban water supply systems, and wastewater treatment facilities—over the next 12 years, has been estimated to cost about $28 billion per year. That is $9 billion to $11 billion more than can be expected under current federal, state and local policies. The labor-management group which studied these and other public investment needs recommended a multi-faceted approach. The federal government must assume its share of this responsibility through measures such as establishment of standards to ensure the public's general welfare and safety, and provision of funds for research, development and catch-up in areas of critical need.

Cities and states have tried to respond to the situation by diversifying their economic structures and by improving the climate for job creation, while at the same time responding to the human needs of those worst affected. But this is difficult in a generally weak economic situation. Also, the Reagan Administration has consistently called for less aid.

THE FARM ECONOMY

When the Reagan Administration took office in 1981, the continued tight money policy by the Federal Reserve Board was a central plank of the Administration's economic program. This policy ushered in a deep recession in the U.S., quickly followed by a worldwide recession.

Foreign food demands declined at the same time that Third World countries were forced to take over more of the international markets for food products in order to repay their debts. American farmers and their local bank creditors became the losers.

In addition to the pressures upon developing countries to export, from mid-1980 to early 1985, the value of the dollar in international exchange increased about 80 percent. Consequently, the international market prices of American farm products rose relative to those of foreign countries; and the U.S. share of world markets for farm products declined. Thus, the U.S. share of the world wheat market between 1978-79 and 1983-84 declined from 45 to 38 percent. The decline in both volume and value of total U.S. farm exports has continued. Between 1980 and 1986, the average price per bushel declined from about $3.90 to $2.40 for wheat, $3.10 to $1.90 for corn, and $7.50 to $4.50 for soybeans. Total assets of U.S. farmers have dropped by $205 billion since 1981 and will drop again in 1986.

"The farmers forced out are not the inefficient and unskilled who dropped out earlier. These are middle-rank operators with well-equipped farming units."

Total real estate assets have fallen $180 billion in the same period.

Equity of farm operators has dropped $216 billion since 1981 to a total of $600 billion.

U.S. net farm income, after having dropped by $7 billion in 1985, is expected to decline another $3 billion in 1986.

The farm rate of return on assets has been negative for five straight years. The same is true of the return on equity.

As a result, farmers are being forced out. These are not the inefficient and unskilled farm operators who dropped out earlier. They are middle-rank operators with well-equipped farming units. The liquidity ratio of farm operators generally has dropped below 10 percent and some 38,000 are technically insolvent. The poverty rate on farms rose from 17.7 percent in 1980 to 25 percent in 1985.

The decline of the farm economy spills over into the industrial sector as the demand for tractors, combines, balers and other equipment declines. A study by Iowa State University has indicated that the financial stress in agriculture caused the loss of 327,000 jobs in farm construction and machinery firms from 1977 through 1984. There was a loss of $26.2 billion in total output and a loss of $6.2 billion in wages.

In 1981, agricultural bank failures were only 14 percent of the total number of bank failures for the year. In 1984, the agricultural banks were 41 percent of the total which failed; and late in 1985, they were running more than half the total. Likewise, agricultural banks were more than half the banks on FDIC's list of "troubled banks."

HEALTH AND SOCIAL SECURITY

The 1980s have been difficult for America's sick and older citizens. Republicans at the White House and in Congress have repeatedly attacked programs designed to protect these vulnerable groups, advocating cuts in Social Security, Medicare, Medicaid, medical research, occupational health and safety efforts, and childhood immunization and nutrition projects.

Over the last five years, Reagan Republicans have worked to lower the Social Security benefits that go to 37 million retired or disabled Americans, their families and survivors of deceased workers. A quarter of our retired elderly depend on Social Security for 90 percent or more of their annual incomes. Yet in 1981, President Reagan tried to cut Social Security by $200 billion through the 1980s. Last year, the Republican-controlled Senate tried to put a one-year freeze on Social Security cost-of-living adjustments.

Public outrage saved Social Security, but health care programs have taken a beating. Medicare was cut more than $21 billion during Reagan's first term of office, and White House budget proposals for fiscal year 1987 called for a cut in funding of another $50 billion over the next five years. Older citizens now face a $492 deductible when entering the hospital, up almost 25 percent from 1985 levels and projected to climb to $732 by 1991. Medicaid now reaches only half of the nation's poor children. Health research efforts have suffered, too, at a time when expenditures for military R&D have soared. And all of this is coming as the mortality rate for infants one-month to one-year old rose for the first time in 18 years.

POVERTY AND HUNGER

During the Reagan Republican years, the incidence of poverty hit an 18-year high. Gains made since this nation declared war on poverty in the mid-1960s were erased.

In 1985, according to the Census Bureau, 33.1 million Americans—14 percent of the population—had incomes below the poverty level. This was an increase of 3.8 million over the number in 1980. The rate of poverty, which was 13 percent in 1980, has never fallen below 14 percent in any year since after the peak of 15.2 percent in 1983.

Among the nation's children, the incidence is even higher: one in five is living in poverty.

Poverty is extremely high for minorities. Among blacks, the poverty rate was 31.3 percent in 1985, and for Hispanics it was 29 percent—up from 25.7 percent in 1980.

In 1980, according to the Census figures, 40 percent of families with the lowest incomes received 16.7 percent of all family income, while the top 20 percent of families accounted for 41.6 percent of the total. By 1985, the bottom 40 percent were down to a 15.5 percent share and the share of the top 20 percent had risen to 43.5 percent.

This meant, in terms of average incomes, that the lowest 40 percent moved from $10,000 per family in 1980 to $12,765 in 1985. After allowing for inflation, this group of families suffered an average 1985 real income loss of $300. Average income for the top 20 percent, on the other hand, moved from $49,865 in 1980 to $71,650 in 1985. Their real incomes, after allowing for inflation, had risen by over $6,500—10 percent.

If the distribution of income had not worsened between 1980 and 1985, the poorest fifth of families would have received $10 billion more in 1985 than they actually did and the wealthiest fifth would have received nearly $40 billion less.

Several studies show that hunger is a serious and growing problem in the United States. Yet in the spring of 1986, President Reagan all but denied its existence, declaring that any hunger is merely the result of poor people's ignorance of where to seek help.

HOUSING

The Reagan Republican Administration has reneged on the long-standing federal commitment to decent and ample housing for all Americans. The result is much hardship and declining housing conditions nationwide for many lower-income persons. Middle-income families have suffered as well.

High interest rates have made it difficult to buy a home. Even with mortgage interest rates currently declining because of the weakness of the national economy, housing is still unaffordable for many. Others have become home owners, but only at great cost.

Today, even with home mortgage costs "down" to 10 percent, the median cost of a home is $80,000, so a family with 10 percent down needs $632 a month just to pay principal and interest. Over the life of a 30-year loan, the interest payment will be $155,000, or about twice the cost of the home.

The purchase of a home is thus made possible in many cases only by a second income in the household, or payment of an extremely high percent of income for home ownership costs, or purchase of a smaller condominium or cooperative unit rather than a traditional house.

A recently-released MIT-Harvard study of housing showed that high housing costs pose serious problems for renters and for first-time home buyers. For rental housing, the study found that the median rent-to-income ratio rose from 20 percent in 1974 to 29 percent in 1983. The number of physically inadequate rental units has increased in recent years, particularly for single-parent families and for lower-income renters.

"If taxes had remained at their pre-1981 levels, the nation would have no budget deficit in 1986."

Renters were not the only ones to suffer. Home ownership has become more difficult to achieve as well. The study notes that home ownership rates fell between 1980 and 1985, with the greatest decline occurring among households under the age of 35. The study found that the after-tax cash cost for the typical home buyer was about 31 percent of income in 1985, down from 35 percent in the early 1980s but well above the average of about 26 percent in the early 1970s.

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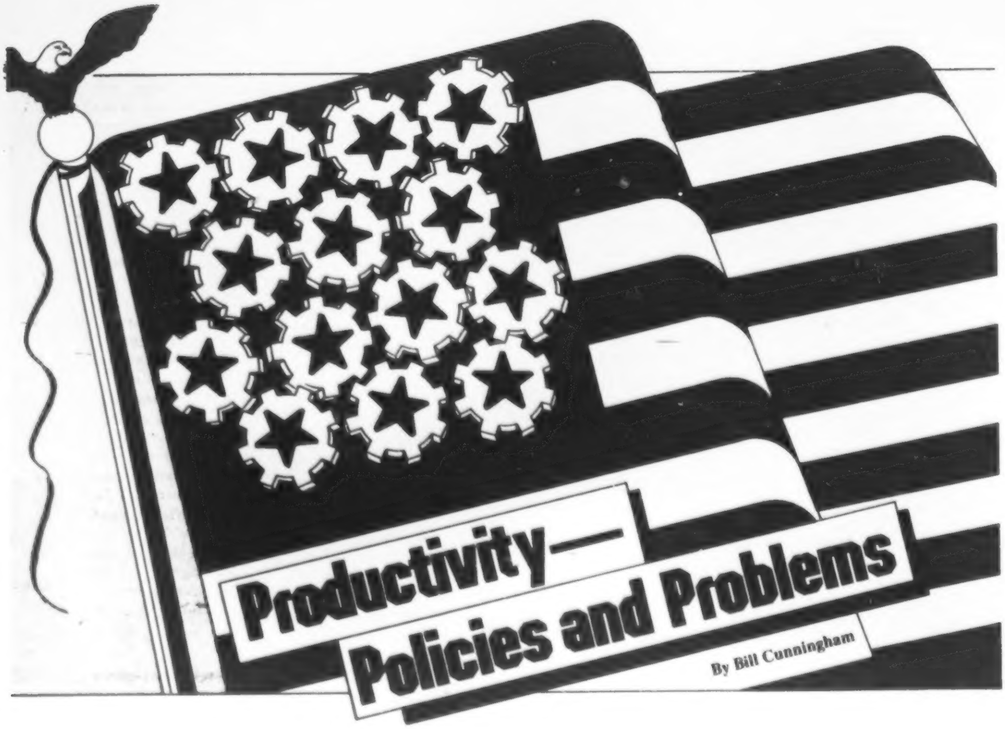


Productivity—Policies and Problems

By Bill Cunningham

American workers produced in 1983 goods and services worth on the average $19.50 an hour in all private industry and $22.50 per hour in manufacturing alone. That's more than twice as much as each worker produced 35 years ago, measured in dollars corrected for inflation. And the United States still maintains its lead as the most productive nation in the world, although some nations are catching up because their productivity is growing faster.

In 1983, American workers were 7 percent more productive than workers in Germany, 39 percent higher than Japanese workers, and 45 percent higher than those in the United Kingdom according to Labor Dept. figures on Gross Domestic Product per person employed.

Productivity gains are an engine of progress and contribute to a higher standard of living for all Americans when the gains lead to higher wages and benefits rather than only to higher profits. And higher wages increase consumer purchasing power, which is essential to keep the economy growing and healthy. Of course, higher wages and benefits are necessary to raise living standards, and workers' gains are best achieved when employees have a union to represent them. Unions have also been shown to contribute substantially to higher productivity.

The author, Bill Cunningham, is an economist on the staff of the AFL-CIO Dept. of Economic Research.

Why Productivity Grows

An understanding of what causes productivity to grow is important to the development of improved economic policies. A key ingredient is a healthy economy with rapid business expansion. The strongest productivity growth is achieved when unemployment is falling and consumer demand is strong, because that climate stimulates the factors that lead to higher productivity.

The use of high interest rates and tight credit by the government to fight inflation tends to slow the growth of production and investment in the kinds of activities that raise productivity.

The factors contributing to higher productivity include investment for expansion and modernization of plant and equipment, on-the-job training programs, and school and university programs to train workers in the newest skills for growing job opportunities. Also, research and development spending leads to new products and production processes. Public infrastructure development, consisting of transportation systems, sewer and water systems, schools, and other public investment, provides support facilities essential for production of goods and services.

In a recent study of the relationship between productivity growth and output growth, Keith McKee and Carol Sessions of the Illinois Institute of Technology concluded that "most productivity improvement occurs because of an increase of output by the nation or by individual industries." Looking at U.S. industries they concluded, "Some industries did well and some poorly, but the first order trend was that productivity increased at the same rate as the rate of increase in output. Such a strong correlation was not anticipated and appears to indicate that the trend found for U.S. industries seems to follow that for the industrial nations."

Invest and Modernize

Investment for expansion and modernization of plant and equipment has more than kept up with the growth in the labor force, meaning that each worker works with far better equipment than in the past. According to the Bureau of Labor Statistics measure of potential capital services, the potential service available from plant and equipment has gone up 165 percent per hour worked since 1949. Although it declined in 1976-78, this measure began rising again in 1979 before dropping again in 1983.

The share of the nation's income devoted to investment in plant and equipment has been gradually rising since World War II as shown by the Commerce Dept.'s survey of Plant & Equipment Expenditures. Investment as a share of GNP rose from about 9.5 percent in the 1950s, hitting 11.2 percent in 1979 and 1980. The investment share fell during the recession to 9.2 percent in 1983.

Recent data, however, show contradictory investment figures, both weak and strong. The Commerce Dept.'s Plant & Equipment Survey shows investment at 9.2 percent of GNP in the first six months of 1984, reflecting no improvement over 1983. Another series from the Commerce Dept., on Fixed Nonresidential Investment, shows strong growth in investment registering a 11.5 percent share compared to 10.5 percent in 1983. Why the discrepancy exists and which series is more accurate remains to be determined.

A study by Edward Denison, a leading productivity expert, found that increases in the amount of plant and equipment account for about 15 percent of productivity growth in recent decades.

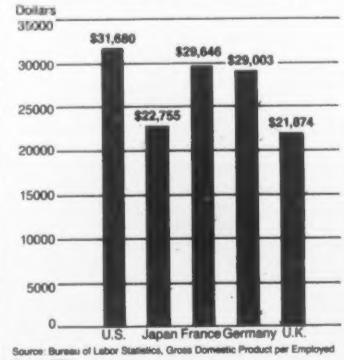
Investment for modernization of plant and equipment has gradually improved the quality and productive potential of the nation's workplaces, although some companies and industries have fallen behind. Plant and equipment have become increasingly more modern since World War II. The average age of plant and equipment in U.S. manufacturing fell from 13.9 years in 1945 to 9.0 years in 1981 before rising to 9.2 years in 1983 as a result of the recession, according to Commerce Dept. figures.

Education, a Vital Factor

The nation's commitment to education has improved the quality of the workforce, making a vital contribution of all to productivity. Better education through schools and training programs accounts for 20 percent of U.S. productivity growth in recent decades, according to Edward Denison's study. Advances in knowledge from all other sources contribute an additional 54 percent. Education provides the basis for inventions, new materials, and the improved flow of work from one operation to another. And education supplies the workforce with the basic skills for applying such advances in technology and know-how.

The 1.7 million patents issued in the United States since World War II testify to the scientific progress of the American people and to their ability to consistently develop new ways for producing more and better goods and services.

The U.S. Produces More per Worker than Other Countries



Source: Bureau of Labor Statistics, Gross Domestic Product per Employed Person, 1983.

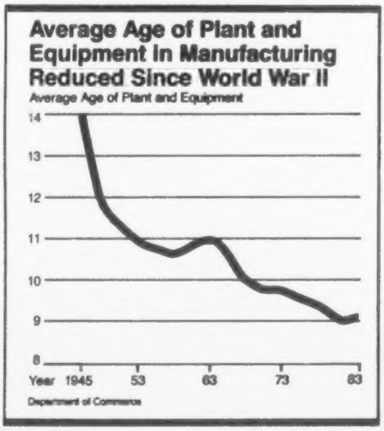
America's R&D Leadership

The United States is the world's leader in the development of new technology, and it spends more on research and development than Japan, France, and Germany combined. The National Science Foundation reports that in 1982, the United States spent $80 billion on R&D compared to $26 billion for Japan, $18 billion for Germany, and $11 billion for France. West Germany devotes a slightly larger share of its income to R&D — 2.81 percent of its gross national product compared to 2.63 percent for the United States. R&D accounts for about 2.4 percent of GNP in Japan and 2.1 percent in France. Scientists and engineers make up a larger share of the labor force in the United States than in any major competing country.

Spending on R&D has gradually expanded over the years. Overall spending for research and development rose to record levels each year after 1976 following a slump during the recession of 1974 and 1975. About $88 billion dollars, more than ever before, was spent in 1983 by private industry, universities, and government, with the federal government contributing 46 percent of that amount. The federal share of R&D has fallen as a result of lower spending on the space program and defense research.

Scientific research and development helps raise productivity, through the development of new machines, new production methods, and new products. As with other factors contributing to productivity, research and development spending is much stronger when the economy is healthy.

Investment by federal, state and local governments makes a large contribution to improved productivity.


Average Age of Plant and Equipment in Manufacturing Reduced Since World War II

Average Age of Plant and Equipment

Department of Commerce

Schools, colleges and universities increase the skill and knowledge of the workforce. Investment in transportation systems, public power projects, sewer and water systems, and police and fire stations provides the basic facilities necessary for the production of goods and services. Government antitrust enforcement of competition strengthens private institutions, also making possible higher productivity.

Elimination of discrimination on the basis of race, age, and sex also helps to raise productivity. Discrimination prevents people from using their talents to their utmost potential and results in lower overall productivity.

Education, training, investment, and research and development are the basic, long-run causes of the rise in productivity. At any given time, output per work-hour depends on how efficiently the economy is using its plant, equipment, and labor. A recession with layoffs and unused equipment results in a drop in productivity. Putting workers as well as idle machinery and equipment back to work will result in a rise in productivity.

A New Economic Climate

Economic circumstances that affect productivity growth have changed dramatically in recent decades. Increased foreign competition, high interest rates, more rapid fluctuations in business conditions, and the export of U.S. technology are major problems with which America must cope if the economy is to realize its productive potential.

Foreign competition increasingly comes from countries that give subsidies and assistance to their industries to help them win the competitive battle in world markets. Leading industrial countries have adopted coordinated industrial policies that increase the viability and competitiveness of their industries.

High Interest Rates

Interest rates have been at historically high levels during the past five years. Government policy of encouraging high interest rates to fight inflation, increasing demands for credit and the huge federal budget deficit have pushed up interest rates and thus made it more costly to finance new plant and equipment. The prime interest rate charged to large corporate borrowers rose from 6.8 percent in 1977 to a high of 18.9 percent in 1981 and was still over 11 percent in November 1984.

The real rate of interest, which is the actual rate less the rate of inflation, is thought by many experts to be a better indicator of the burden of interest rates on borrowers. The real rate of interest to large corporate borrowers averaged 8 percent over the past four years compared to 1.1 percent in the 1970s. The high cost of capital has put American producers at a great disadvantage in competing with foreign producers.

A study by George Hatsopoulous, a Director of the Federal Reserve Bank of Boston, argues that the high cost of capital is America's biggest handicap in competing with other nations. That study shows the real cost of capital in the United States at three times the level faced by Japanese business. According to the Hatsopoulous study, in 1981 Japan had a cost advantage of about $2,300 on a product costing $10,000 due to the lower cost of capital in Japan, in addition to the advantage due to lower labor costs.

The high interest rates have also raised the value of the dollar relative to the currencies of other nations, making it more difficult to export and to compete with imports. The higher U.S. interest rates are a major factor in the deterioration of U.S. competitiveness.

High interest rates and other nonlabor costs including profits and depreciation have been rising much faster than labor costs in the 1980s. From the first quarter 1980 to the third quarter 1984, unit nonlabor costs in private business rose 37 percent compared to a 24 percent rise in unit labor costs.

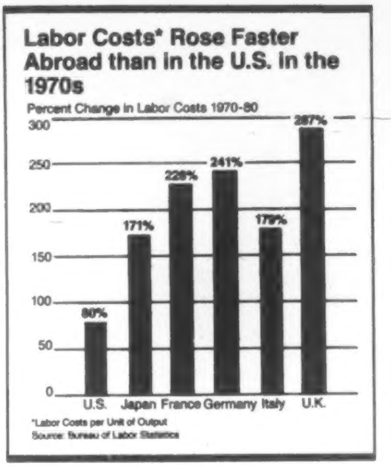
The ups and downs of the business cycle have become more frequent in recent years producing increasingly serious recessions and disappointing recoveries. The recessions have reduced consumer demand and created greater uncertainty for new investment.

New technology developed in the United States (often at taxpayer expense) is sometimes made available to foreign competitors as quickly as in the United States, thus eliminating a U.S. competitive edge and export opportunities. An example of this transfer of technology is the robotics industry. The United States is at the fore of the development of robots, but several U.S. companies producing robotics have licensed foreign manufacturers to produce robots invented in this country. Many robots introduced into Japanese industry are made in Japan with the permission of the U.S. companies that invented them, and Japan may become a major source of robots for the United States.

Industrial Policy

These changes in economic circumstances have prompted the AFL-CIO to give support to the proposals for an industrial policy to deal with the factors adverse to growth in production and productivity. Adoption of an industrial policy could signal a national commitment to the rebuilding of the industrial base as the foundation for long-term balanced growth and the fulfillment of the nation's commitment to a policy of full employment.

To that end, the AFL-CIO supports the proposal for a National Industrial Policy Board — including representatives of labor, business, academia, the public, and government — which would identify industries that are vital to national economic growth and employment and the industrial development priorities that should be assisted through targeted policies. The Board would oversee a National Industrial Development Bank, patterned after the Reconstruction Finance Corp. which operated from the late 1930s to about the mid-1950s. The bank would be authorized to make and guarantee loans to finance approved reindustrialization ventures.



Labor Costs* Rose Faster Abroad than in the U.S. in the 1970s

*Labor Costs per Unit of Output

Source: Bureau of Labor Statistics

Who Gets the Gains?

The success of the American economy is due in large part to a strong base of consumer purchasing power. Higher U.S. wages enabled America to lead the world in the adoption of mass production. Mass production is both a cause and result of high wages.

If wages and benefits fail to rise enough to share in productivity gains, then profits, dividends, executive salaries, and the like rise disproportionately. Wealth becomes more concentrated in the hands of a relatively small elite, causing buying power to lag and creating an imbalance that leads to a drop in sales, a piling-up of merchandise, production cutbacks, layoffs — and ultimately another recession or depression.

There is nothing automatic to assure that the benefits of productivity are broadly and equitably distributed. Therefore, rising productivity presents the potential for trouble as well as the potential for progress.

In the 1920s, rising productivity was translated into booming business profits, but wages and buying power and living standards of the great mass of American people lagged far behind. Sales of goods and services did not increase as fast as they could be produced. Profits also spilled over into speculation in commodities, real estate, and corporate stocks. This led to a seriously lopsided, unbalanced economy which was a major cause of the 1929 crash and the Great Depression of the 1930s.

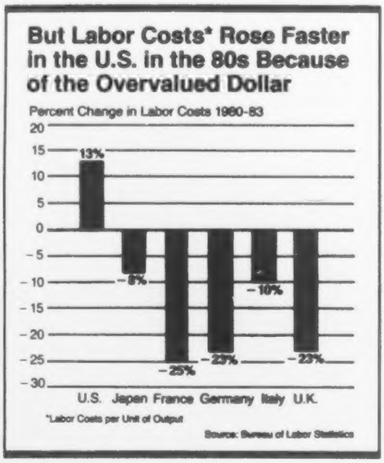
Labor Costs and Productivity

For the majority of consumers, wages are the source of the buying power necessary to sustain a healthy economy. But raising wages does not necessarily mean raising labor costs, because they are not the same thing. For example, a 5 percent pay raise for workers in a "widget" factory might be expected to raise the labor cost for widgets by 5 percent. But if widget output per worker-hour also goes up 5 percent, there is no change in labor cost per widget.

When more is produced for each hour of work, there is an increase in the total amount of goods and services in the economy. Who gets those additional goods and services depends on how the gains of productivity are divided. For example, if productivity increases by 5 percent, workers must get a 5 percent wage increase just to maintain their share of the income. Rental income, interest income, executive salaries, dividends and profits - could all increase by 5 percent since the total output has gone up by 5 percent.

So it is a mistake to identify labor costs too closely with wage rates. Labor costs may go down even when wages rise because of productivity gains.

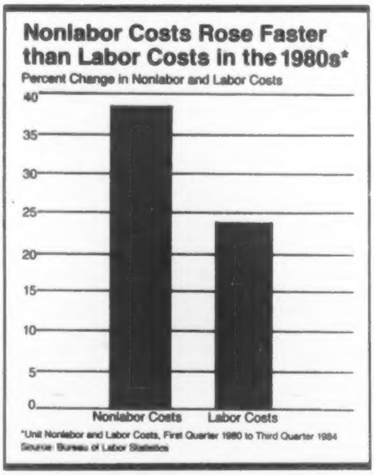
Increases in the cost of living that reduce worker buying power also erode the potential for producers to sell their goods, so wages have to increase as much as the increase in prices and productivity just to maintain workers' share of national buying power.


But Labor Costs* Rose Faster in the U.S. in the 80s Because of the Overvalued Dollar

*Labor Costs per Unit of Output

Source: Bureau of Labor Statistics

Productivity gains are a source of higher wages, shorter hours, more holidays and longer vacations, earlier retirement, and general improvement in living standards. But because higher productivity means producing more goods and services over the same number of hours worked, productivity increases can also have destructive effects on workers and their jobs. Thus, workers have a vital interest in how productivity is shared.


Nonlabor Costs Rose Faster than Labor Costs in the 1980s*

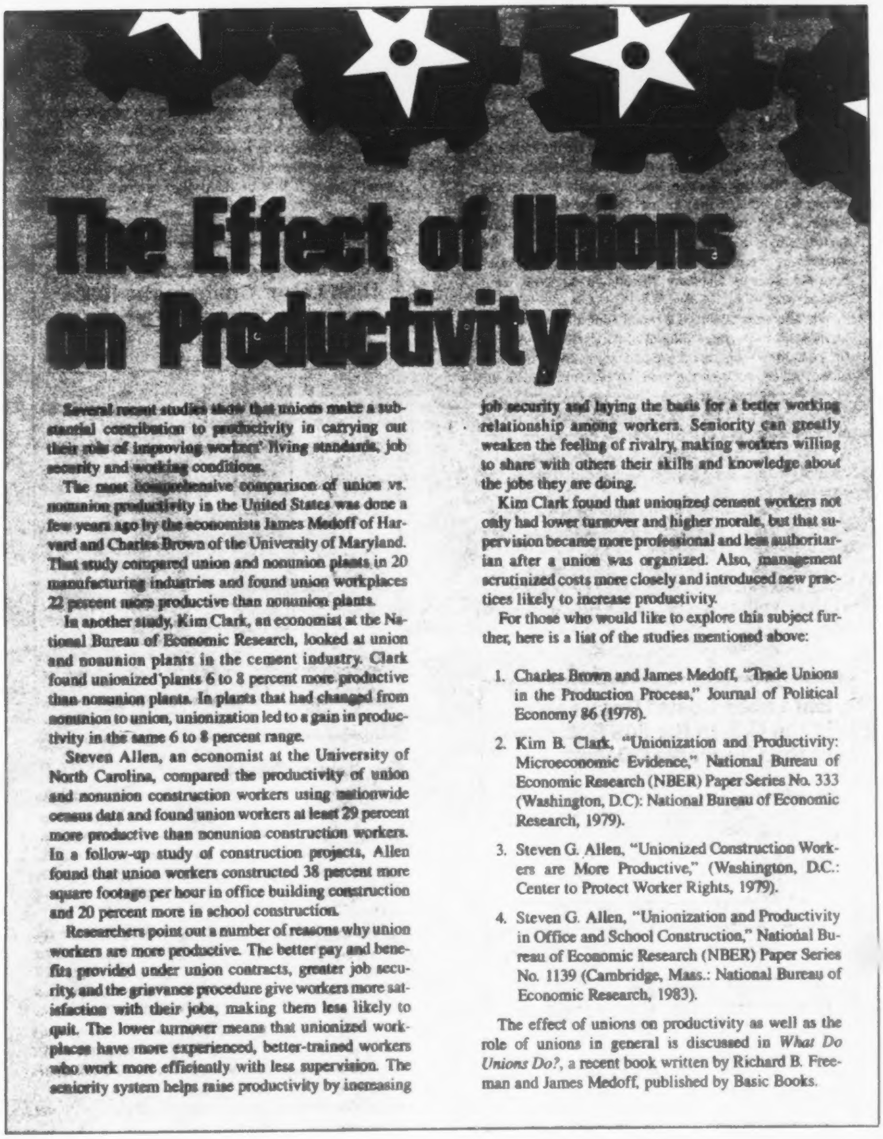
*Unit Nonlabor and Labor Costs, First Quarter 1980 to Third Quarter 1984

Source: Bureau of Labor Statistics

Key Role of Unions

Collective bargaining plays a crucial role in dealing with both the dangers and opportunities of increased productivity. The flexibility of collective bargaining helps workers and their unions settle with employers on reasonable and humane protections against the adverse effects of new production methods and to share in the gains of productivity.

But the union role of protecting workers from the adverse impact of productivity is only one dimension of the collective bargaining agreement, which also does much to stimulate productivity. The needed protections, for job security and in such areas as job safety, can themselves contribute substantially to productivity gains by reducing lost work time. And the stability brought to the workforce through acceptance of seniority, the grievance procedure or other standard features of a collective bargaining contract can contribute to worker morale and consequently to productivity.



The Effect of Unions on Productivity

Several recent studies show that unions make a substantial contribution to productivity in carrying out their role of improving workers' living standards, job security and working conditions.

The most comprehensive comparison of union vs. nonunion productivity in the United States was done a few years ago by the economists James Medoff of Harvard and Charles Brown of the University of Maryland. That study compared union and nonunion plants in 20 manufacturing industries and found union workplaces 22 percent more productive than nonunion plants.

In another study, Kim Clark, an economist at the National Bureau of Economic Research, looked at union and nonunion plants in the cement industry. Clark found unionized plants 6 to 8 percent more productive than nonunion plants. In plants that had changed from nonunion to union, unionization led to a gain in productivity in the same 6 to 8 percent range.

Steven Allen, an economist at the University of North Carolina, compared the productivity of union and nonunion construction workers using nationwide census data and found union workers at least 29 percent more productive than nonunion construction workers. In a follow-up study of construction projects, Allen found that union workers constructed 38 percent more square footage per hour in office building construction and 20 percent more in school construction.

Researchers point out a number of reasons why union workers are more productive. The better pay and benefits provided under union contracts, greater job security, and the grievance procedure give workers more satisfaction with their jobs, making them less likely to quit. The lower turnover means that unionized workplaces have more experienced, better-trained workers who work more efficiently with less supervision. The seniority system helps raise productivity by increasing job security and laying the basis for a better working relationship among workers. Seniority can greatly weaken the feeling of rivalry, making workers willing to share with others their skills and knowledge about the jobs they are doing.

Kim Clark found that unionized cement workers not only had lower turnover and higher morale, but that supervision became more professional and less authoritarian after a union was organized. Also, management scrutinized costs more closely and introduced new practices likely to increase productivity.

For those who would like to explore this subject further, here is a list of the studies mentioned above:

1. Charles Brown and James Medoff, "Trade Unions in the Production Process," Journal of Political Economy 86 (1978).
2. Kim B. Clark, "Unionization and Productivity: Microeconomic Evidence," National Bureau of Economic Research (NBER) Paper Series No. 333 (Washington, D.C): National Bureau of Economic Research, 1979).
3. Steven G. Allen, "Unionized Construction Workers are More Productive," (Washington, D.C.: Center to Protect Worker Rights, 1979).
4. Steven G. Allen, "Unionization and Productivity in Office and School Construction," National Bureau of Economic Research (NBER) Paper Series No. 1139 (Cambridge, Mass.: National Bureau of Economic Research, 1983).

The effect of unions on productivity as well as the role of unions in general is discussed in *What Do Unions Do?*, a recent book written by Richard B. Freeman and James Medoff, published by Basic Books.

The effect of unions is vividly shown in studies done over the last few years. Harvard economists Richard Freeman and James Medoff examine the evidence in a recent article, "Trade Unions and Productivity: Some New Evidence on an Old Issue," published in the *Annals of the American Academy*, May 1984. They conclude that "Econometric investigations have yielded new evidence concerning collective bargaining's impact on productivity. These findings indicate that in many sectors, in particular manufacturing and construction, unionized work places are on average more productive than nonunion ones."

The relationship between labor and management is clearly an important factor in productivity. In general, the labor management climate where unions are firmly established has gradually improved since World War II and is reflected in the reduction in days lost due to strikes and the increase in the use of arbitrators and mediators to solve disputes.

Management and labor in some cases have adopted programs for labor-management cooperation in order to secure a better working relationship and enhance the opportunity to improve efficiency.

America's Ability to Compete

The competitiveness of American industry is aided by the higher productivity of American workers and attempts to bring about a better working relationship between workers and their employers. Despite these factors, the nation faces a major crisis in international competitiveness.

America's crisis in international trade has intensified over the last three years. Trade in manufactured goods was in surplus as recently as 1981. In 1983, exports fell more than $11 billion and imports rose $15 billion. For manufactured goods, the deficit of $38 billion in 1983 was more than two and one-half times the deficit of 1982. Projections based on the first ten months of 1984 are for a staggering trade deficit of over $90 billion in manufactured goods for the full year.

A sharp rise in the dollar after July 1980 caused severe damage to the nation's competitive ability. From July 1980 to September 1984, the value of the dollar rose 72 percent against the currencies of major trading partners. This means higher costs, including higher unit labor costs. The rise in the value of the dollar made U.S. exports more expensive in foreign countries and made imports cheaper. The rise in the value of the dollar means that a U.S. manufacturer roughly competitive in 1980 might be at a 72 percent cost disadvantage today.

The primary cause of the rise in value of the dollar is the high level of U.S. interest rates. Foreign investors, wanting to take advantage of higher U.S. interest rates, are trading their currencies for dollars and thereby bidding up the price of the dollar.

The sharp rise in the value of the dollar followed a decade in which unit labor costs in the United States rose at a much slower pace than those abroad. Even though productivity was rising more rapidly abroad, unit labor costs — that element that affects prices — were rising more slowly in this country because of slower increases in wages and the impact of exchange rates. Unit labor costs in the 1970s rose 171 percent in Japan and 241 percent in Germany compared to a much smaller rise of 80 percent in the United States. Despite this dramatic improvement in competitiveness of U.S. products, the trade deficit grew worse during that period because foreign governments were so successful in subsidizing their own exports.

It would be unreasonable to expect productivity increases to cope with unfair trade practices or to grow enough to make up for the sudden and tremendous rise in value of the dollar. It would also be unreasonable to expect workers to make wage concessions to make up the difference. It would take wage cuts of 15 percent per year each year for the last four years to make up the difference. A reduction in interest rates would bring about considerable relief for American manufacturing industries.

Productivity Measurement

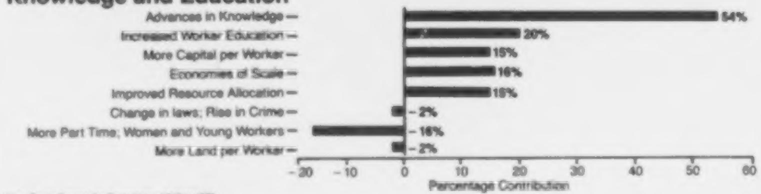
The measurement of productivity for the U.S. economy is done by the Bureau of Labor Statistics (BLS) of the Dept. of Labor. BLS publishes productivity measures quarterly and yearly for the total economy, except government and non-profit enterprises. The most comprehensive measure is called Output per Hour in the Private Business Economy. BLS publishes separate productivity data for manufacturing, farms and non-financial corporations. Measures are published yearly for 122 selected industries, but no productivity data are published for individual corporations. Also available are BLS data showing the growth in manufacturing productivity in other industrialized countries.

The total measure of productivity does not include government because government workers primarily provide services, and the output of services is difficult to measure. The rapidly growing health care industry is an example of the problem of measuring the output of services. Doctors and health care employees have been aided by new medicines, equipment, and knowledge which help prevent illness and make treatments of patients more effective. The number of cured patients and the improvement in the health of the community rather than the number of patients treated would be a better measure of productivity of health care.

Productivity Since 1950

Productivity growth in the 1970s was slower overall than in the previous two decades although manufacturing productivity growth did hold up. The slower growth rate led to a good deal of discussion as to its causes.

The Largest Contributions to Productivity Growth are Advances in Knowledge and Education



Note: Study Covers the Period from 1948 to 1973
Source: Edward Denison: *Accounting for Slower Economic Growth*

Manufacturing productivity has showed surprising strength in the 1970s despite the unfavorable economic conditions. For all the 1970s, manufacturing productivity rose an average of 2.5 percent per year, compared to 2.0 percent in the 1950s and 2.8 percent in the 1960s.

For the early 1980s, productivity continued to grow very slowly because of the recession, but picked up substantially in 1983 as output increased. Productivity for the nonfarm business sector grew an average of only 1 percent from 1980-82, but registered 3.5 percent growth in 1983 accompanying a 5.0 percent rise in output. Nonfarm productivity declined 0.7 percent in the third quarter of 1984 as the growth in output fell sharply.

Nonmanufacturing productivity has continued to show weakness in the 1980s. While manufacturing productivity grew 4.3 percent in 1983, nonmanufacturing posted only a 1.6 percent gain. The diversity of productivity growth rates by economic sector and by industry suggests that researchers should look further than the overall numbers to see why productivity is growing at a healthy pace in some industries but is weak in others. Productivity growth from 1962 to 1982 ranged from an average of 4.7 percent a year in communications to 2.6 percent in manufacturing and finance and 1.1 percent in the services.

There is also diversity within manufacturing. In manufacturing for the same 20-year period, productivity growth registered a 6.2 percent average yearly increase in hosiery, 5.2 percent in synthetic fibers, 4.6 percent in milk, and 4.5 percent for radio and TV sets. Lower figures are found in primary aluminum at 1.1 percent, machine tools with no increase, and footwear, which registered an average decline of 0.2 percent per year.

Some experts have cited special factors in utilities, mining, transportation and retail trade that have reduced the contribution of these sectors to productivity growth. The unique problems of these sectors indicate that analysts should take a closer look at productivity on a sector-by-sector basis.

Productivity growth in utilities was substantial until the energy problems and recession set in during the early 1970s, reducing the growth of energy production. As energy prices rose and demand for energy slowed, many new plants were canceled and unused capacity increased.

Transportation productivity in the 1950s and 1960s was aided by such factors as the construction of the interstate highway system. As the highway system neared completion in the 1970s, its contribution to productivity gains in transportation was reduced.

According to a study by Lester Thurow, 80 percent of the slower productivity growth in mining is due to reduced productivity in oil exploration as the resource base has declined. The extended hours in retail trade are a factor in the slow growth of productivity in this sector. Longer business hours mean more labor time and added convenience to customers, but may have little or no effect on the amount of goods purchased, meaning lower productivity.

Shift to Services

The rapid growth of jobs in services and the decline in manufacturing's share of jobs is often cited by analysts as contributing to slower productivity growth in the private business economy. This negative effect results from the slower productivity growth and lower level of productivity in services. For example, in 1983 the value of production by manufacturing workers averaged $22.50 an hour compared to $13.50 an hour for workers in the service sector. New job holders and workers losing their jobs in manufacturing are taking lower-paying, lower-productivity jobs. The growth in these sectors and the decline in manufacturing mean that overall productivity growth has been slower than if manufacturing had maintained its share of employment. The lower level of productivity in services is in part due to undervaluation of service output rather than an actual measure of the contribution of this sector to total output. The measure of productivity levels in service industries depends in large part on wages, which generally are lower in the services.

Problems Measuring Productivity

Problems in measuring productivity also cause the figures to show slower growth. Measurement is much more difficult during inflationary periods when adjustments must be made for price increases.

Construction productivity measurement is based on very poor price devices called "input" price indexes which are supposed to correct for inflation but which substantially understate the total value of construction and therefore do not give an appropriate output series for productivity measurement. Productivity data for services including finance, insurance and real estate, and retail trade are based on gross dollar receipts which do not fully count physical output increases when output goes up faster than prices.

In analyzing productivity, most studies have looked at the effect of such factors as regulation, capital investment, the increased number of women and teenagers in the workforce, and the work ethic.

Coping with Regulations

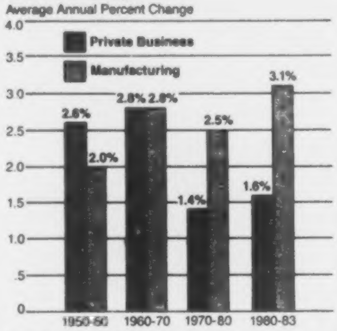
Regulations in the 1970s required business to provide safer workplaces, to be more responsive to customer complaints, to reduce pollution of the air and water, and dispose of wastes in a safe manner. These regulations have been credited with major improvements in air and water quality, public safety, and addressing consumer demands for good quality products.

Fortunately, much evidence indicates that these improvements came with a minimal reduction in business efficiency and productivity, and expenditures to comply with pollution control regulations were basically made in addition to other investments. BLS estimated that investment spending on pollution control equipment reduced productivity growth by only one-tenth of 1 percent per year.

When environmental legislation was first passed in the early 1970s, the law required business to bring existing plants up to standards as well as to equip new plants with pollution control equipment. By the late 1970s, as existing plants caught up to standards, the burden of spending on pollution control was substantially less and continue to be substantially lower in the 1980s.

The makeup of the American workforce has changed since World War II to the point that women now hold about 44 percent of all U.S. jobs, compared with only 29 percent in 1950. Women most commonly hold clerical jobs, and 88 percent hold white-collar or service jobs. Twelve percent hold blue-collar jobs in various crafts and as machine operators, drivers and laborers. There is no evidence that women are less productive in the jobs they hold than men. Studies asserting that women are less productive are based on the assumption that their lower pay indicates lower productivity. The lower pay, rather, is a reflection of the generally lower pay levels of service jobs and of the widespread discrimination against women, not an indication of lower productivity.

Productivity Growth in Private Business Has Slowed While Manufacturing Productivity Has Held Up



Source: Bureau of Labor Statistics

Young Workers

Productivity of teenagers and young adults can be raised by training programs to give them better skills and employment opportunities, and this is particularly important when the number of teenage and young adult job-seekers is growing rapidly. Although the number of American teenagers and young adults grew sharply in the 1970s, the growth in the proportion of teenagers in the labor force in the 1970s was a little less than in the 1960s.

The number of teenagers in the labor force began to decline in 1979. In 1983 there were 8.1 million teenagers in the labor force compared to 9.7 million in 1978. The number of young adults aged 20-24 began to drop in 1982 and 1983. The impact of teenagers on the labor force will be substantially less in the 1980s.

American workers have a strong "work ethic." They want to be productive and to produce good quality products. Much of their identity and self-respect comes from the jobs they do. The data on industry productivity do not indicate any lessening of the work ethic. In some industries productivity rose more than 4 percent per year in the 1970s. These include air transportation, major household appliances, soft drinks, milk, corn milling, hosiery, and synthetic fibers. For manufacturing as a whole, the average yearly increase was 2.5 percent. The workers in high-productivity industries are no different than those in low-productivity industries.

The Role of Savings

Savings and capital availability have been ample to provide investment funds, although the opportunities for investment along with growing consumer borrowing, speculative lending, and foreign lending put heavy demands on credit markets. The fierce competition for credit between those who would use the credit for job-creating investment and those borrowing for other purposes has led the AFL-CIO to recommend credit policies that favor job-creating investment.

Many experts have expressed the concern that savings rates in the United States are not high enough, pointing to higher saving rates in competing countries. The justification for the Reagan Administration's 1981 tax cut that gave much more to the wealthy than to low- and moderate-income taxpayers rested largely on the argument that tax cuts to the wealthy would increase saving and increase the pool of funds available for investment.

More than half of the 1981 tax cut went to business and the wealthiest 10 percent of the population. For example, a family earning $200,000 per year received a tax cut of $9,658, while a family earning $20,000 received a tax cut of only $544.

The tax cuts failed to increase saving. The personal savings rate in the first nine months of 1984 averaged 6 percent of personal income compared to 6.1 percent in the same period of 1980, the year before the tax cut took place. Gross saving, including business and government saving, declined to 14.9 percent of GNP in the first nine months of 1984 compared to 15.5 percent in the same period of 1980. The decline in the gross savings rate was due to the large increase in the federal government budget deficit.

Whatever the cause of lower U.S. savings rates, tax cuts to the wealthy are not a solution, and a reversal of those tax cuts would be in the interest of equity and provide more consumer purchasing power to low- and moderate-income families.

A better understanding of productivity growth can help in the formulation of policies to improve the nation's productivity. A major step forward in adapting to the new economic circumstances would be the adoption of a coordinated industrial policy. Consideration must be given to the dependence of productivity growth on a growing, healthy economy which has full employment and full utilization of capacity. Balanced economic growth, with expanding sales and full employment, must accompany rising productivity. Economic policy must also recognize the importance of a broader distribution of the potential benefits from rising productivity.

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United States Industry in Transition: Human Resource Issues

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United States Industry in Transition:
Human Resource Issues

The quality of the job-related skills of workers in the United Stats will be critical for the success of our industry during the decades ahead. One of the factors which is cited most frequently in connection with the economic success of countries such as Japan, Korea, and Singapore, has been the high level of education of the labor force in those countries. This factor is of equal importance for the United States in its efforts to maintain and expand its industrial base and the jobs of workers in this country.

The importance of an adequate supply of technically trained professionals to United States productivity has received much study. According to a recent report by the National Science Foundation(NSF) "The U. S. economy is becoming increasingly based on scientific and technological activities." (NSF, 1984, p. 1). Among the factors cited in support of this view is the increasing employment of scientists and engineers which rose about three times as rapidly as overall U. S. employment in the period 1976-83. The NSF report attributes this growth to two factors: the concentration of scientists and engineers in industries where employment is rapidly increasing (notably "high technology" industries) and a changing occupational mix, with individual employers increasing their employment of scientists and engineers. This changing mix they consider to be related directly to efforts to improve the productivity and competitiveness of industry in the United States. Many other analyses support the view that the technical human resource pool is critical to our industrial competitiveness. Thus, the availability of a professional work force with the necessary technical skills needs to receive serious attention in any assessment of the factors needed to maintain and improve the competitiveness of business and industry in the United States.

The perception that the quality of the general labor force is an important factor in determining the competitiveness of its industry is supported by extensive evidence that worker productivity is greater when worker knowledge, skills, and abilities match the requirements of the job(e.g. Hunter & Hunter, (1984)). While such a matching would not necessarily lead to a recommendation to seek a high level of skill for all jobs, most jobs which affect the productivity of United States business and industry, including entry level factory and clerical positions, will show improved worker productivity with adequate levels of worker skills in such areas as language use and comprehension, basic mathematics, and knowledge of basic science and technology.

There has been much recent discussion about whether the United States economy is suffering a loss of middle income jobs, and the causes of the observed shifts in income distributions (McMahon and Tschetter, 1986). Some analysts attribute these changes, in part, to the impact of technology, which, they hypothesize, is decreasing the skill levels required to perform many jobs. Other analysts disagree with the view that the long term impact of technology will result in lower skill level requirements for many jobs, and there continues to be debate about the causes of the observed shifts in income. It is unlikely that these issues will be resolved in the near future. However, even if the observed changes in income distribution do prove to reflect, in part, an increase in the proportion of the labor force employed in jobs with lower pay and requiring lower skills (and, as numerous studies in such areas as pay equity show, pay level is often a poor indicator of the level of knowledge and skills required to do a job effectively) such a result would not lead to the conclusion that we do not need to be concerned about the level of work-related knowledge and skills in the general population. Indeed, according to the National Science Board Commission on Precollege Education in Mathematics, Science and Technology (NSB Commission, 1983, p. v), changing technologies are expected result in the need for wide segments of the working population to be well educated in the fundamentals of mathematics, science and technology. One example which can be cited in this regard is the rapidly increasing use of microcomputers in factories and offices, which means that workers on all levels must be able to cope with at least some aspects of these new technologies. Thus, we may well see an increase in the average skill levels required at the lower end of the job skill continuum, whatever happens elsewhere. Since many in business and industry already feel that the skill levels of the present labor force is less than optimal, there is a need to consider the level of basic skills

Rapid changes in technology also require a labor force which can learn new skills efficiently. This requirement, in turn, implies a labor force which is well grounded in the fundamental skills required to facilitate such retraining. As the NSB Commission points out, these "basics" of the 21st century are not only reading, writing and arithmetic, but also include communication and higher problem-solving skills, for the entire population, not just those contemplating careers in science and technological fields.

Finally, there is the issue of literacy in science and technology for the general population. This has been a major focus of the recent discussions of mathematics, science and technology education in the United States. The position which has been taken by many experts is that public policy issues in the United States can be expected to involve science and technology to an increasing extent in the future. From this, it is reasoned that if citizens are to make informed judgments on such issues, they must be well educated, at least in fundamentals of these fields. With regard to the specific issues of concern here, it has been argued that if workers are to deal with the impact of technological change on their jobs, they need to be well-informed about this area.

Thus, there are several arguments which would support the need for effective education in mathematics, science and technology at all levels of our educational system in order for the United States to deal effectively with the changes resulting from technology. Of course, improved skill levels, whether in mathematics, science and technology, or in other fields, should not be regarded as a panacea for the problems arising from transitions taking place in United States industry.

Many countries with highly skilled labor forces have encountered economic problems in productivity and other areas for other reasons. But having a labor force with appropriate skills for today's industrial environment does appear to be a key requirement, without which it will be much more difficult to deal with other problems.

Education and Job-Related Skills in the United States

Unfortunately, the United States today is not among the leaders of the developed nations in the education of its citizens, particularly in the areas of mathematics, science, and related technologies. While skills in other areas are also important, I shall concentrate my discussion on these areas, because they are especially critical to the competitiveness of our industry, and because of the evidence that, in some important respects, the United States is facing especially difficult educational problems in these areas.

In saying this, I do not wish to imply that the present quality of our technically trained professionals is inferior. On the contrary, by many measures, the training of our best students in these areas is excellent, and has improved substantially over the years. There are three important issues facing the United States today, however, in maintaining and further developing the technical human resources to support our changing economy. First, while the quality of the best students has been excellent, there are many signs that the educational infrastructure which is required to continue to produce such individuals is in trouble at all levels, from primary school to graduate education. Second, various indicators suggest that unless we develop and implement a national policy to increase the numbers of students choosing such careers, we may find ourselves facing a serious shortage of scientific and technical personnel. Third, the level of skill in mathematics and science in the general population is well below that found in many developed nations, with the result that the labor force in many technical support positions, and in many other jobs which require at least a reasonable level of basic skills in these areas may lack the requisite skills to maximize their productivity.

In science and mathematics, fields of particular importance for achieving the level of technological innovation required to maintain a position of economic world leadership, tests of student accomplishment find the United States ranking among the lowest of the developed nations(NSB Commission, 1983, p. 17). Differences in precollege education in science and mathematics have been cited as probable contributors to these differences. The Commission reviewed data from a number of sources, and reported such findings as that far less than 40% of high school students in the United States take 3 years of science and mathematics, while close to 100% of high school students in the USSR, West Germany, and Japan, do so. Another example is provided by comparisons between students in the United States and Japan on science questions in the Second International Science Study (Humrich, 1987), 1987). The results show substantial differences between students in the two countries on questions in physics, with the Japanese students scoring higher. Differences were much smaller in other sciences, such as biology. The pattern of differences may be related to differences in emphasis in the educational systems:

there is a strong emphasis on mathematics in the Japanese curriculum, which, while imprtant for all sciences, is especially pertinent to physics, while Japanese high schools place less emphasis on the biological sciences than is typical of many schools in the United States.

There has been national concern over the past several years about the quality of science and mathematics education being given in the high schools and elementary schools in this country. Concern has been expressed over the low numbers of teachers going into high school science and mathematics teaching in recent years, and some have projected a national shortage. Furthermore, teachers in the elementary grades often have little training in the sciences, are not comfortable teaching it, and spend relatively little time on it. Yet, the evidence is strong that attitudes towards science and mathematics are formed early, so the quality of science education in the primary grades is very important in developing the skills and attitudes needed if students are to take more of these courses in high school, and prepare themselves for careers in technical fields.

This concern over the quality of mathematics, science, and technology education at the pre-college level has led to a reversal of the trend to deemphasize efforts in this area at the national level which had developed in the early 1980s and which contributed to the elimination of such federal initiatives as the Science Education Directorate at the National Science Foundation. The Science Education Directorate has been restored, and there are many examples of other efforts in this area, such as the science education initiative at the American Association for the Advancement of Science, efforts by many other scientific and professional societies, and many initiatives at the state and local level. Business and industry have made substantial contributions to these efforts, and there is evidence that some of the problems are being addressed. However, it is too early to say how effective the remedial actions being taken will be, and it seems clear that a long term effort to improve pre-college education in mathematics and science will be needed if significant improvement in students' performance in these areas is to be achieved.

A particular concern arises from the changing demographics of the population in the United States. The number of 16 to 24 year olds as a percentage of the labor force is expected to decrease at least into the 1990s as a result of the pattern of decreasing birth rates which this country has experienced (Andrisani and Daymont, 1982; Vetter and Babco, 1986). While there have been recent changes in this trend (U.S.Department of Commerce, 1987, p.62-3), it is still likely that the size of the cohort available to undertake technical careers will be lower than it has been in the past. In addition, the composition of the entrants into the labor force is changing. The proportion of students from minority groups is increasing, and women are becoming a larger proportion of the labor force.

Women, and some minority groups, continue to be under-represented in scientific and technical professions. While there has been a substantial increase in the number of blacks who attend college, significant disparities remain, both in numbers attending college, and in field distribution (Dix, 1987, p. 3). Disparities are even larger for Native Americans. While the numbers of Hispanics attending college has increased from 1976 to 1982, the increase has resulted from an increase in the college-age Hispanic population, rather than from an increase in the proportion of Hispanics attending college, which remains low (Dix, 1987, p. 2). Low participation rates in higher education, of course, will limit opportunity for careers in science and technology. Intervention programs have had demonstrable effects on student outcomes (Marrett, 1987, p. 15). But recent decreases in the proportion of minority students entering college is causing serious concern. Thus, despite the gains which have been made by these minorities, much more needs to be done to insure their full participation in science and technology.

Women have increased the number of college degrees which they receive, and there has been a very substantial increase in the numbers of women in the sciences and engineering in recent years. However, women are still very much under-represented in these fields. Moreover, there is recent evidence that the growth in the numbers of women entering scientific and technical professions is decreasing, and may have stopped in some fields. Engineering provides a good example of both of these developments. There was a dramatic change, in the numbers of women entering engineering: the proportion of women engineering majors increased from 2 percent of entering freshmen in 1970 to 17% in 1983, and there were expectations that women would soon enter engineering in the same numbers that they have in other professional fields, once the barriers to their entry were reduced. It now appears that these estimates were optimistic, however; the proportion of women in the class of 1984 dropped to 16.5,and remained at that level in 1985 (Vetter, 1987, p 6). Vetter has concluded that both the numerical and proportional increases of women into science and engineering has ended. In considering the implications of this trend, it is important to note that most of the increase in science and engineering degrees over the past several years had resulted from the increasing numbers of women receiving such degrees (Vetter, 1987). The numbers of males obtaining doctorates in the sciences peaked over a decade ago, and subsequently declined (Vetter and Babco, 1986, p. 36.)

Thus, we face a situation where the prospective labor force will be made up increasingly of groups who have traditionally not entered science and engineering in large numbers, at the same time that the interest in such careers by those who traditionally have selected them appears to have passed its peak. Already, a substantial portion of those undertaking graduate study in some science and engineering fields in the United States are foreign nationals. A good example is seen in doctorate-granting schools of engineering, where over 41% of the students were foreign nationals in 1984 (Vetter & Babco, 1986, p.28). While this trend should not be assumed to be negative in its implications for the United States, it does raise some public policy questions. The public policy implications of the increasing proportion of foreign-born male faculty in some science and engineering fields also deserves consideration, and there are some specific issues with regard to the impact on students: communications problems have been reported due to language differences, and concern has been expressed that women students may encounter problems because of cultural differences regarding the proper role of women (Vetter, 1987, p. 6). These factors could further depress the entrance and retention of United States nationals in engineering and science programs, at a time when many believe that their entrance is being depressed by our educational system.

There are other problems facing the United States in maintaining and developing its technical human resource base. The high cost of new science equipment has made it difficult for even large universities to maintain state of the art science labs in some cases. Four year undergraduate colleges, which have produced many excellent scientists in the past, are finding it even more difficult to maintain the quality of their science curricula. There have been a number of initiatives aimed at correcting these problems, but, as in the case of precollege education, it is too early to assess their impact.

All of these considerations lead to the conclusion that we may face a problem in the future in maintaining the pool of professionals in the sciences and technology which we have had in the past, unless effective action is taken over a continuing period. Furthermore, we could face the loss of these jobs to overseas locations, just as we have lost manufacturing jobs. Already, some programming jobs have been "exported". A trend in this direction could have very serious long term consequences for the United States.

The demographic trends noted above are also relevant to the general labor force in the United States. Unless something is done, the level of mathematics, science, and technical skills, already considered too low by many for optimum productivity, may fall even lower. While there are some positive trends, e.g. girls are taking more mathematics courses in high school, a great deal more needs to be done, especially as regards education in rural areas and inner-city schools.

Summary

In summary, I would like to urge the importance of considering the human resource dimension in any discussion of the strategies needed to deal with the transitions taking place in the economy of the United States. Education at all levels, from pre-school to graduate school, and in the home and other institutions as well, is a crucial factor in maintaining and strengthening our human resource base. The prospect of continuing, rapid technological change means increased need for updating of worker skills, and for insuring that all have the skills required to pursue additional training effectively. There have been serious problems in the past in science and mathematics education, and while steps have been taken in some measure to deal with them, a strong and continuing effort, with effective leadership and resources at the national level continues to be essential. Demographic factors, including the increasing proportion of minorities and women in the labor force, require special efforts to insure the effective education of all students in science, mathematics and technology. All of these considerations support the importance of the human resource dimension.

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TRADE, TECHNOLOGY AND JOBS: POLICY IMPLICATIONS OF STRUCTURAL CHANGE IN U. S. LABOR MARKETS

by

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Structural change in U. S. labor markets has seemed particularly rapid and disruptive in recent years. Of greatest concern to many is the failure of manufacturing employment to rebound as strongly as service sector employment has from the 1981-1982 recession. To some this has raised the spectre of a "McJobs" economy in which "bad" service sector jobs have replaced "good" manufacturing jobs to the detriment of the standard of living of the average American. Others note that technology may save us from becoming a nation of hamburger stands, but it will not prevent the disappearance of many middle class jobs if the employment opportunities available to most workers in the emerging high-tech "MacJobs" economy are worse than the traditional manufacturing jobs they have replaced while the better jobs require skills that the average worker does not possess. Finally, the emergence of a large trade deficit has focused attention on international competition as a major force threatening to deindustrialize the U. S. economy and make the distribution of earnings more unequal.[1]

This paper provides a framework for developing policy responses to the kinds of structural change that are taking place in U. S. labor markets. In it, a distinction is drawn between long term changes that might threaten the economy's ability to deliver a high and rising standard of living to most Americans and short term shocks that are disruptive to individual workers, firms, or communities, but that do not pose a threat to long term growth or the distribution of earnings. An important finding is that, for most Americans, there is little reason to fear long term changes in the industrial or occupational structure of the economy. In fact, the average American worker will enjoy a higher standard of living in an economy open to new technologies and international competition than in one resistant to change. The challenge to policymakers is to protect the minority of individual workers who might be hurt by these developments from suffering a serious decline in their standard of living without unduly impeding the process of adjusting to change.

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[1] See Bluestone B., and Harrison. B.. The Deindustrialization of America (New York: Basic Books) 1982; Bluestone. B. and Harrison. B.. "The Great American Job Machine: The Proliferation of Low Wage Employment in the U. S. Economy." a study prepared for the Joint Economic Committee of the U. S. Congress. December 1986: Reich. R. B.. "Industrial Policy," The New Republic. March 31. 1982: Kuttner. The Economic Illusion (Boston: Houghton Mifflin) 1984; Thurow. L.. "Losing the Economic Race," New York Review of Books. September 27. 1984; and Etzioni, A., An Immodest Agenda (New York: New Press) 1983 for a representative set of views on deindustrialization, the decline of the middle class, and the loss of competitiveness.

Is America Deindustrializing?

Production data lend little support to the idea that the United States is losing its industrial base and becoming "deindustrialized." Manufacturing output is higher than it has ever been and there has been very little change in the share of real GNP accounted for by manufacturing since the end of World War II (figure 1). Looking at all goods-producing industries, there has been a somewhat greater decline in their share of all production than there has been in manufacturing alone, but agriculture, mining, and construction account for 6.0 percentage points of the 8.2 percentage point drop in the share of total output accounted for by goods producing industries between 1959 and 1984 and these industries are not what is generally thought of as the nation's industrial base.[2] The story is different, however, when one looks at employment. There has been a steady decline in the share of jobs accounted for by manufacturing since World War II and an absolute decline in manufacturing jobs since 1979 (figure 2).

Despite these trends in manufacturing employment, job growth in the economy generally has not stagnated. Between 1972 and 1984, 23 million new jobs were created in the American economy, including 5 million between 1979 and 1984. Moreover. the absolute decline in manufacturing jobs is a recent phenomenon. From 1972 to 1979. employment rose in most manufacturing industries. with textiles and apparel and leather and footwear the only notable exceptions. After 1979. however, many more manufacturing

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[2] Kutscher, R. E. and Personick, V., "Deindustrialization and the Shift to Services," Monthly Labor Review, June 1986, Table 2, p. 7.

Fig. 1:Trends in Manufacturing Output

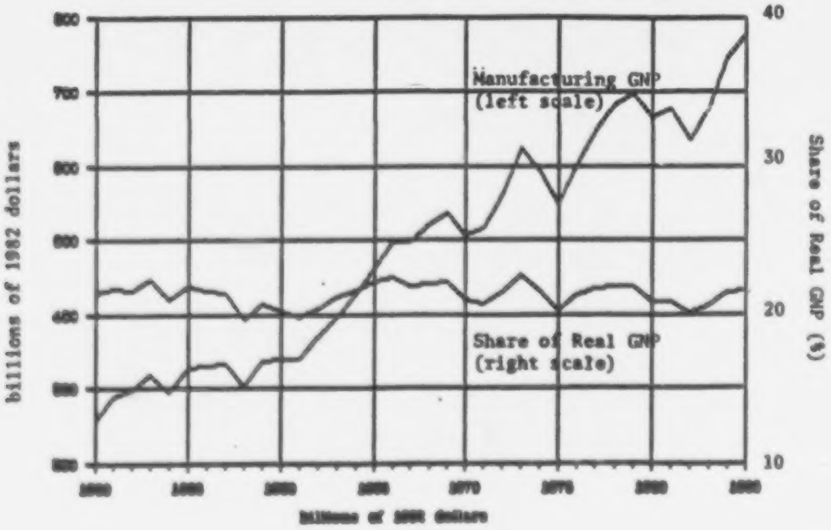
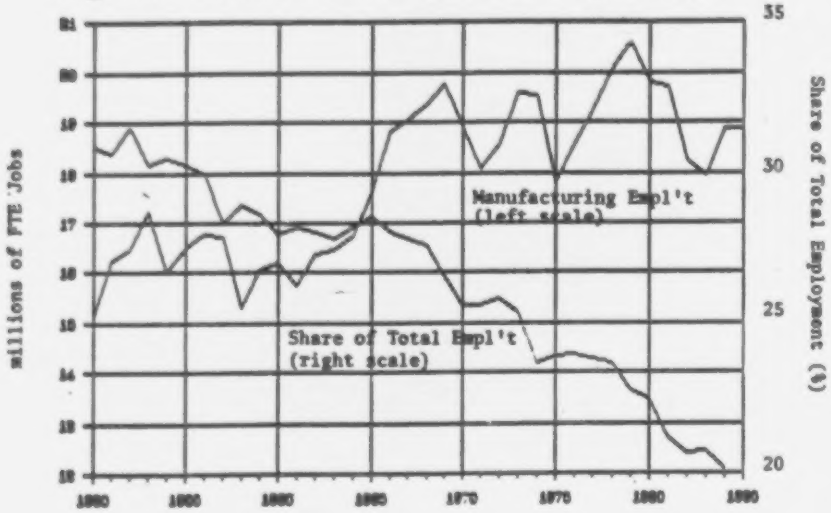


Fig. 2: Trends in Manufacturing Empl't



SOURCE: National Income and Products Accounts industries suffered job losses and the total number of manufacturing jobs fell by 1.6 million between 1979 and 1984. The first column of table 1 shows that these manufacturing losses, plus smaller losses in agriculture and mining, were more than offset by strong growth in the service sectors of the economy.

Many blame international competition for the failure of manufacturing employment to grow in the 1980s. However, arguments that focus on unfair foreign trade practices or a fundamental inability of U. S. producers to meet the cost and quality standards set by foreign producers, overlook the critical role played by U. S. macroeconomic policies in aggravating the employment problems of the manufacturing sector in recent years. The U. S. has been on a consumption binge fueled by large federal budget deficits. It has postponed paying for this consumption by borrowing abroad, but the inevitable consequence of this excessive spending and foreign borrowing has been a large trade deficit and a distorted pattern of growth in output and employment. Whether the trade practices of our competitors are fair or not, they have not changed appreciably since the 1970s, yet between 1972 and 1979 more jobs were created by exports than were lost to imports and it was not until the 1980s when large federal budget deficits and high real interest rates drove up the value of the dollar that more jobs were lost to imports than were created by exports.

Figure 3 shows estimates of the number of jobs created by exports and the number of jobs lost to imports in 1972, 1979, and 1984.[3] Between 1972 and 1979 both the number of jobs created by exports and the number of jobs lost to imports increased, but the

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[3] An input-output model was used to estimate the number of jobs embodied in U. S. exports and the number of jobs that would be required to replace U. S. imports with domestic production. This methodology provides an accounting framework for decomposing actual employment into the employment that would be required to meet domestic demand with domestic production. the additional employment generated by production for export, and the reduction in employment arising because some domestic demand is met with imports rather than domestic production. The number of jobs required to meet domestic demand with domestic production is. however. a hypothetical concept, and most of the jobs classified as "lost" to imports never existed in the first place. Thus, the slightly misleading phrase "jobs lost to imports" is shorthand for the more cumbersome phrase "jobs lost to imports and jobs that were never created because imports substituted for domestic production."

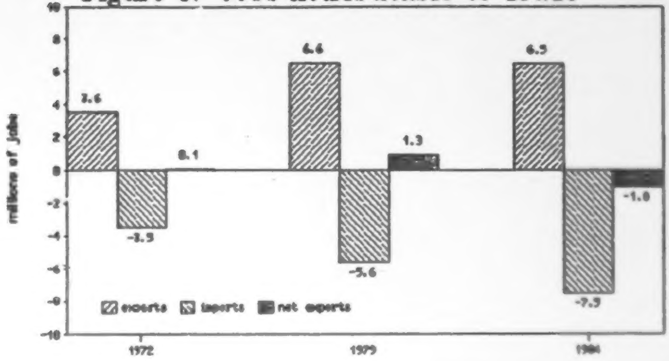
TABLE 1

Employment Changes by Industry, 1979-84

	Change in Employment	Change due to Trade
agriculture, forestry, fisheries	-47	-111
mining	-53	-12
construction	41	139
manufacturing	-1622	-1680
transportation, communications, utiltie	104	135
wholesale and retail trade	1103	784
finance, insurance, and real estate	782	134
services	5127	596
government enterprises	-2	14
	5433	0
MEMORANDUM: MANUFACTURING INDUSTRIES		
Durable Goods		
Lumber and Wood Products	-96	-21
Furniture and Fixtures	1	-7
Stone , Clay, and Glass	-110	-29
Primary Metals	-418	-219
Fabricated Metal products	-245	-73
Machinery, except Electrical	-325	-218
Electric and Electronic Equipm	153	-277
Motor Vehicles and Equipment	-128	-157
Transportation Equipment	-88	-66
Instruments and Related Produc	8	8
Miscellaneous Manufacturing	-54	-90
Nondurable Goods		
Food and Kindred Products	-129	-2
Tobacco	-5	-5
Textile Mill Products	-117	-142
Apparel and Other Textile Prod	-123	-192
Paper and Allied Products	-26	-17
Printing and Publishing	161	12
Chemicals and Allied Products,	-62	-63
petroleum refining	-21	-6
Rubber and Misc. Plastics Prod	-2	-46
Leather	-57	-71

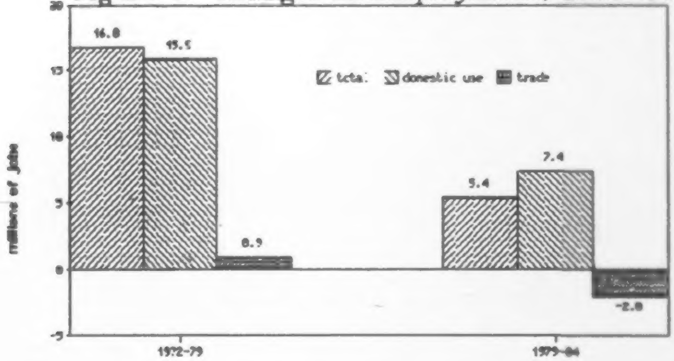
SOURCE: author's calculations based on Bureau of Labor Statistics data on employment by industry (includes part-time, unpaid family workers and the self-employed). Change due to trade is the difference between actual employment growth and employment growth with 1979 trade shares.

Figure 3: Jobs Attributable to Trade



SOURCE: Author's Calculations

Figure 4: Changes in Employment, 1972–84



SOURCE: Author's Calculations

former grew more rapidly and the net contribution of trade to employment rose from under 100,000 jobs in 1972 to nearly a million jobs in 1979. After 1979, however, the number of jobs attributable to exports fell slightly while the number of jobs lost to imports increased substantially. By 1984 the number of jobs lost to imports exceeded the number of jobs created by exports by more than a million. Between 1972 and 1979 employment in the private economy rose by 17 million, with a million of those jobs accounted for by trade. Between 1979 and 1984, in contrast, when the total number of jobs grew by 5.4 million, negative trade effects subtracted 2 million jobs from the 7.4 million that would have been required to meet domestic demand with domestic production (figure 4).[4]

Calculations such as these are often used to support claims that trade has cost the American economy 2 million jobs since 1979, but such claims are highly misleading. Aggregate output and employment in the economy are determined much more by the level of aggregate demand supported by monetary and fiscal policy than they are by the composition of demand. It seems unlikely that the Federal Reserve would have allowed domestic demand to grow faster than it did between 1979 and 1984 without the help afforded by the strong dollar and import competition in restraining inflation. In other words, if trade had been more balanced after 1979, overall job growth in the economy probably still would have been about 5.4 million, but many fewer jobs would have been lost in manufacturing and as many fewer jobs would have been created in the rest of the economy.[5] Estimates of the size of these shifts are provided in the second column of table 1. Although jobs lost in manufacturing were offset by gains elsewhere in the economy and although some of the manufacturing jobs lost to trade during this period will be recovered as the trade deficit shrinks, most new jobs generated in the economy nonetheless will not be manufacturing jobs.[6]

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[4] See Stone, C. F. and Sawhill, I. V., "Labor Market Implications of the Growing Internationalization of the U. S. Economy," National Commission for Employment Policy Research Report RR-86-20, June 1986, pp. 1-14.

[5] Changes attributable to trade may create some structural unemployment and raise the unemployment rate at which inflation is stable. However, any such increase in structural unemployment between 1979 and 1984 was probably quite small compared to the increase in unemployment attributable to slack economic activity associated with the fight against inflation.

Implications of the Loss of Manufacturing Jobs

Have these changes in the pattern of output and employment had an impact on the economy's ability to grow or on the distribution of earnings? Is there something inherently "good" about the jobs that are being lost and something inherently "bad" about the jobs that are being gained? Certainly, a steelworker or auto worker who loses his job is unlikely to find a comparable job at a comparable salary if the number of jobs in his industry is shrinking, but is the same true for a textile worker who loses his or her job? Have every ten $30,000 a year manufacturing jobs that have been lost been replaced by two $100,000 a year management or professional jobs and eight $12,500 a year clerk or rent-a-cop jobs as the deindustrialization hypothesis would seem to imply?

Studies by Stanback and Noyelle and Henle and Ryscavage have been cited by some in support of the hypothesis that changes in the industrial and occupational mix in the economy have contributed to growing earnings inequality, but more recent studies by the Bureau of Labor Statistics suggest that if there was such a trend it had been reversed by the middle 1970s, which, ironically, is when fears of deindustrialization first began to be heard.[7] McMahon and Tschetter, for example, show that those occupations with the highest median earnings in 1982 accounted for a larger proportion of all workers in 1982 than they did in 1973, whereas those occupations with middle and low median earnings in 1982 accounted for a smaller percentage of all workers in 1982 than they did in 1973. These data lend no support to the hypothesis that the occupational structure of the economy is changing in such a way as to increase the inequality of earnings.

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[6] Cf. Kutscher and Personick. p. 11 and Stone and Sawhill. pp. 27-29.

[7] See Stanback, T. M. and Noyelle. T. J., Cities in Transition. 1982: Henle. P. and Ryscavage, P., "The Distribution of Earned Income among Men and Women. 1958-77." Monthly Labor Review. April 1980: Rosenthal. N. H.. "The Shrinking Middle Class: Myth or Reality, Monthly Labor Review. March 1985: McMahon. P. J. and Tschetter, J. H., "The Declining Middle Class: a Further Analysis," Monthly Labor Review, September 1986.

Nevertheless, McMahon and Tschetter find that the distribution of earnings across individuals became more unequal over the same period. They reconcile this finding with their evidence on the distribution of earnings across occupations by looking at the distribution of earnings within occupational groups. They show that all occupational groups contained a larger proportion of workers with low earnings in 1982 than they did in 1973. Even among occupations with the highest median earnings, for example, there was a larger proportion of workers making well below that median in 1982 than there was in 1973. McMahon and Tschetter are agnostic about how to interpret these findings. Their data, however, are consistent with Robert Lawrence's hypothesis that the increase in the inequality of earnings that has taken place since 1973 is a demographic phenomenon reflecting the entry of a large number of baby-boomers into the workforce.[8] In other words, during the 1973-1982 period, a large number of young workers entered the labor force at the bottom end of their respective occupational pay scales. Over time, if this hypothesis is correct, the cohort of baby-boomers will move up the pay ladder across all occupations and the trend toward greater earnings inequality will be reversed.

Bluestone and Harrison claim to reject this hypothesis in their Joint Economic Committee testimony. However, their data show little change in the distribution of earnings for either younger workers or older workers between 1973 and 1984. What their data do show is that, consistent with the demographic hypothesis, the proportion of younger workers earning low incomes is much larger than the proportion of older workers earning low incomes and that the proportion of workers less than 35 years old rose from barely over half the labor force in 1973 (50.2 percent) to 51.4 percent of the labor force in 1984. Despite these demographic shifts, their data show little change in the distribution of earnings for all workers between 1972 and 1984.[9]

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[8] Lawrence, R. Z., "Sectoral Shifts and the Size of the Middle Class," The Brookings Review, Fall 1984.

Although these data are hardly conclusive, they do suggest that observed changes in the structure of the economy are as consistent with a benign explanation as they are with the deindustrialization hypothesis. Moreover, a decline in manufacturing output and employment is not by itself evidence of economic decline. Suppose, for example, output per worker grows more rapidly in manufacturing than in the rest of the economy (as it has in the United States) but that the demand for other goods and services grows more rapidly than the demand for manufactured goods as income rises. The economy will grow over time because productivity growth in manufacturing will allow the same amount of output to be produced with fewer workers, freeing some workers previously employed in manufacturing to expand non-manufacturing output. However, workers will spend a disproportionate amount of their higher wages on goods and services other than manufactured goods. As the economy grows, manufacturing output will fall as a share of total output and manufacturing employment will fall even more rapidly as a share of total employment. Also, the economy's growth rate will fall as a larger and larger share of

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[9] Bluestone and Harrison use one-half median 1973 earnings and twice median 1973 earnings to divide the earnings distribution into three groups. They adjust 1979 and 1984 earnings by the Consumer Price Index to estimate changes in the earnings distribution over time. Their data show a reduction in earnings inequality from 1973 to 1979 and an increase in earnings inequality from 1979 to 1984. However, use of the CPI tends to understate real wage gains over this period. Using the preferred PCE index, Bluestone and Harrison's data show a modest reduction in the proportion of workers with low earnings and a modest increase in the proportion of workers with middle and high earnings:

	Using CPI			Using PCE		
Earnings	1973	1979	1984	1973	1979	1984
Low	31.8	30.4	32.4	31.8	29.9	30.4
Medium	51.6	53.1	52.7	51.6	52.1	52.1
High	16.6	16.5	14.9	16.6	18.0	17.5

Also, 1973 and 1979 were high employment years and 1984 was a mid-expansion employment year. Other things equal, the distribution of earnings at the next cyclical peak will show fewer workers with low earnings than in 1984.

output and employment is composed of slow-productivity-growth activities. Nevertheless, the economy will continue to grow and it would be foolish to try to raise the growth rate by forcing greater production of the manufacturing output that consumers do not want and reducing the production of the non-manufacturing goods and services they do want.

Nor is growing wage inequality a necessary outcome of the structural changes just described. If, for example, all workers had similar skills and training, wages would have to be essentially the same in the manufacturing and non-manufacturing sectors of the economy. Otherwise, everyone would seek work in high-paying industries and no one would seek work in low-paying industries. Productivity growth in manufacturing would translate into lower prices for manufactured goods rather than higher wages for manufacturing workers. All workers would benefit from the lower prices and everyone's real wage would rise. Over time, the proportion of workers in manufacturing would fall, but there would be no change in the distribution of earnings.

In the real world, of course, earnings differentials are widespread. To some extent they represent returns to education and training that are necessary to induce people to invest in that education and training. Earnings differentials also arise because people differ in the minimum wage for which they are willing to work and the kinds of jobs and working conditions they prefer. Different occupations offer different risks, amenities, and disamenities; and wage differentials arise to reflect those differences.

Each of these explanations for why wage differentials exist is based on workers' choices in a free market in which all workers can qualify for all jobs. Wage differentials can also arise, however, if some workers are barred from some jobs, either because they lack the ability to acquire the specific skills needed for the job or because they are discriminated against in one way or another. Obviously, it is not enough merely to want to be a professional baseball player; one must have the ability as well. More subtly, unions may succeed in raising wages in some industries to a point where more people want to work in that industry than employers want to hire, forcing some workers to accept lower paying jobs elsewhere. Similarly, discrimination against women and minorities may segment labor markets in a way that limits the kind of competition for high-paying jobs that tends to keep wage differentials to a minimum.

The possibility that some jobs in some industries may not be open to all raises the possibility that changes in the structure of the economy can change the distribution of earnings. Suppose, for example, the high wages paid in smokestack industries were achieved through the ability of unions in those industries to obtain wages substantially above what similarly skilled workers could earn elsewhere in the economy. Should employment shift from smokestack industries to industries elsewhere in the economy, middle income jobs would be replaced by lower income jobs. To the extent this shift of employment out of smokestack industries is associated with lower prices, all other workers (including those at the top of the earnings distribution) would see their real wage rise. In this way the distribution of earnings could become more unequal. Of course, if there is no artificial wage differential between workers in smokestack industries and workers in other industries, that is to say, if the higher wages paid to these workers reflect their better work habits and a higher general productivity that can be transferred to other jobs, they should continue to earn good wages even if smokestack industry jobs are replaced by other kinds of jobs.

It is hard to argue conclusively for one or the other of these explanations, but the steel industry, which accounts for a substantial fraction of the long-term losses in manufacturing jobs in the economy, would seem to be one in which large union wage premiums rather than inherent job skills account for the high wages paid and the difficulty steel workers have finding comparable jobs as the steel industry contracts. The automobile industry is similar, but it has not yet suffered so severe a contraction as the steel industry. Aside from these two industries, most of the other long-term losses in manufacturing jobs have occurred in relatively low wage industries (Table 2). Thus, recent losses of high-wage manufacturing jobs may simply represent a shakeout and short run adjustment in specific industries rather than a long-term trend toward greater earnings inequality associated with a shift of employment away from manufacturing.

Table 2
Relative Compensation by Industry

	Relative Compensation*			Comp. Change 1972-84	Empl't Change 1972-84
	1972	1979	1984	(percent)	(000)
agriculture,forestry,fisheries	0.484	0.535	0.506	4.5	-206
mining	1.260	1.480	1.526	21.1	133
construction	1.189	1.159	1.103	-7.3	1212
manufacturing	1.097	1.161	1.179	7.4	365
transportation, communications, ut	1.300	1.396	1.381	6.2	800
wholesale and retail trade	0.849	0.807	0.772	-9.1	3798
finance,insurance, and real estate	1.023	1.001	1.075	5.1	2013
other services	0.823	0.821	0.858	4.2	12015
government	1.080	1.052	1.092	1.1	n.a.
households and rest of world	0.464	0.480	0.496	6.9	n.a.
MEMORANDUM: MANUFACTURING INDUSTRIES					
Durable Goods					
Lumber and wood products	0.866	0.947	0.889	2.6	-21
Furniture and fixtures	0.826	0.821	0.825	-0.2	15
Stone, clay, and glass product	1.103	1.161	1.171	6.2	-68
Primary metal industries	1.332	1.550	1.478	11.0	-332
Fabricated metal products	1.129	1.167	1.156	2.5	-52
Machinery, except electrical	1.222	1.265	1.292	5.7	155
Electric and electronic equipm	1.094	1.104	1.188	8.5	615
Motor vehicles and equipment	1.577	1.645	1.699	7.8	-14
Other transportation equipment	1.358	1.446	1.493	9.9	53
Instruments and related produc	1.126	1.127	1.218	8.1	147
Miscellaneous manufacturing in	0.878	0.864	0.896	2.1	-30
Nondurable Goods					
Food and kindred products	1.019	1.075	1.066	4.6	-134
Tobacco manufactures	1.012	1.303	1.505	48.8	-10
Textile mill products	0.763	0.779	0.777	1.8	-157
Apparel and other textile prod	0.650	0.633	0.619	-4.9	-256
Paper and allied products	1.143	1.253	1.309	14.5	-8
Printing and publishing	1.135	1.063	1.079	-4.9	332
Chemicals and allied products	1.301	1.406	1.486	14.3	39
Petroleum and coal products	1.636	2.065	2.196	34.2	-7
Rubber and miscellaneous plast	1.032	1.028	1.045	1.2	151
Leather and leather products	0.713	0.683	0.689	-3.3	-103

* Ratio of industry compensation per full time equivalent (FTE) worker to economy-wide compensation per FTE.

SOURCE: National Income and Product Accounts

A more subtle way that structural change may aggravate earnings differentials is if workers in smokestack industries earn high wages based on having acquired job-specific skills rather than transferable skills. In this sense, workers in these industries are like shareholders who have made an investment in these industries. When the industry does well, they do well, but when the industry does poorly, their earnings fall and they suffer the equivalent of capital losses.[10] Of course, workers who put in the time and acquire experience in emerging industries might also acquire job-specific skills that allow them to earn equivalently high wages as their industries prosper. If this happens, there need be no long term worsening of the distribution of earnings arising from structural change in the economy, but if it does not, the loss of smokestack jobs may result in the irreplaceable loss of middle income jobs.

In general, changes in the industrial structure of the economy can lead to changes in earnings inequality that persist over time only if it is meaningful to talk about high-wage, middle-wage, and low-wage workers based on inherent and largely immutable skills and job requirements. This would be the case, for example, if there were certain highly-valued skills that a large number of workers lacked and could not acquire through education and training, if there were labor market segmentation that allowed otherwise similar workers to earn quite different wages depending upon where they happened to work, and if there were fairly rigid requirements for workers with different skills that differed substantially across industries. Under these circumstances, a change in the industrial and occupational mix that raised the demand for high- and low-wage workers relative to the demand for middle-wage workers would aggravate earnings inequality.

If, in contrast, new entrants to the labor force are largely unconstrained as to where they can work and employers can readily change production processes to take advantage of the different combinations of skills likely to be available at different times, market forces will encourage a greater supply of new workers into jobs with high wages and a reduced supply of workers into jobs with low wages so that over time any tendency toward greater earnings inequality across industries and occupations will be minimized. Long term earnings differentials will give appropriate signals to new workers as to the skills that are worth acquiring as well as giving appropriate signals to firms about how to pick production techniques and make investments that take maximum advantage of the kinds of workers that are available. It is unreasonable to think that existing workers and existing firms can adjust immediately and painlessly to changing conditions, but historically the American economy has shown this kind of flexibility over extended periods of time and is likely to continue to do so into the future.

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[10] The industry can do well if it is especially innovative. but it can also do well if it enjoys some market power that allows it to boost prices above costs. Strong unions may be able to capture some (or all) of such monopoly profits in higher wages, but such gains are achieved at the expense of consumers and workers in other industries and do not contribute to the nation's aggregate income.

These observations suggest that potential problems from structural change fall into two categories, one having to do with long term growth and the possibility that a substantial fraction of the population might be left behind even if the economy experiences a satisfactory overall growth rate, the other having to do with short term disruptions that can nevertheless wreak havoc with individual workers' lives. The problems emphasized in the debate over deindustrialization tend to be of the first kind. However, the economy's ability to grow and to compete in international markets depends much more on our ability to make productive investments, both in physical capital and in knowledge and people, than it does on what particular pattern of goods and services we produce. Deindustrialization is to some extent a natural occurrence in a wealthy economy moving into a post-industrial state. The distribution of earnings in such an economy is much more a function of the distribution of skills and educability among the population than it is of the industrial or occupational composition of employment opportunities.

In the short run, however, changes in the pattern of demand can cause some experienced workers to lose their jobs and face little prospect of getting them back. These workers will suffer a decline in their standard of living that cannot be recovered if they were earning high wages associated either with job-specific skills or with labor-market segmentation that kept their wages above what similarly-skilled workers were earning elsewhere in the economy. These short run adjustment problems are not to be minimized, but it should be recognized that they have little to do with any long run tendency for the distribution of earnings to worsen. Furthermore, even these short run adjustment problems will be less severe if we pursue appropriate high-employment and growth-oriented policies.

Long-term Implications of Foreign Competition

If the economy were not becoming increasingly internationalized, we could conclude this discussion of whether America is becoming deindustrialized by saying, maybe, but so what? The pursuit of sensible high-employment and growth policies in an economy with a commitment to equal job opportunities for all should generate the kind of rising tide of economic growth that lifts all boats, regardless of what was happening to the industrial and occupational mix in the economy. But can the same be said in a world in which other industrial countries are as capable of sophisticated research and development as we are and in which newly-industrializing countries can supply standardized industrial products more cheaply than we can produce them in the United States? What if U. S. companies relocate overseas to take advantage of cheaper foreign labor? What if immigrants and illegal aliens compete with American workers for jobs?

The lessons of economic theory and of economic history are that trade improves a country's growth prospects and standard of living. The theoretical argument rests on the observation that trade encourages countries to export goods in which they enjoy a comparative production cost advantage and to import goods with high domestic production costs. By acquiring some goods indirectly through trade rather than producing them directly, a country increases its consumption opportunities over what they would be if the country tried to be self-sufficient in all goods. The experience of the United States since the end of World War II has shown that the gains from trade are not just an academic abstraction. Writing in 1985, Nobel prize winning economist Paul Samuelson observed:

> Since 1950 the typical American has had a rise in real income of about 93 percent. A respectable fraction of this gain came from technical progress abroad....Our purchases from abroad give us the benefit of the services of foreign workers and resources; at the same time that this is a bargain to us, it raises the real wage rates of workers abroad as a wider circle of consumers bid for their services. Examine a 1950 Sears catalog and the equipment in a 1950 hospital; do the same for 1985, and realize that much of our real gains do stem from cheaper imports.[11]

Although trade tends to raise standards of living generally, different kinds of workers are affected differently. International competition encourages the United States to increase production of goods and services that take advantage of its relative abundance of skilled labor, capital, and sophisticated technology, while discouraging the production of standardized manufactured goods that employ relatively unskilled workers. Also, the increasing technological capabilities of other industrial countries means that U. S. producers must be more sensitive to foreign competition than they once were. On balance, this should encourage producers to adapt more quickly to new technologies and changing markets; it will erode artificial wage differentials and encourage differentials that give appropriate price signals to workers as to what kinds of skills are worth acquiring.

Those with the education and training to find work in the dynamic sectors of the economy have little to fear from technological change and international competition. In fact, their rewards will be greater, on average, in an economy open to change than in one resistant to change. Those with less education and training face a different prospect, however. Competition from standardized products produced with cheap foreign labor, the relocation of U. S. operations abroad, and direct competition from immigrants will tend to keep the earnings of those with the least education and training from rising in line with

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[11] Samuelson, P. A., "How Not to Cure the Imbalance of Trade," The New York Times, September 15, 1985.

general economic growth. If a sizeable segment of the population is unwilling or unable to acquire the education and training needed to be successful in a competitive world economy, the earnings gap between skilled and unskilled workers may well widen.

The Short Run Costs of Economic Change

Apart from this threat to the earnings of unskilled workers, the most serious problem associated with adjusting to new technologies and foreign competition is the short term risk to individual workers' earnings. Changes in the pattern of demand for different kinds of workers may cause some workers, including some well-paid, experienced workers, to lose their jobs and face little prospect of getting them back. Some of these dislocated workers may move readily to another job, but others with investments in specific skills, union wage premiums, community or family ties, or a lack of knowledge of alternatives will not move so readily, especially if the only prospects they face entail lower earnings than they enjoyed in the past. It will be small comfort to them to know that the nation as a whole is benefitting from the changes that are causing them hardship.

If the short run costs of adjusting to economic change are not identified and proper policy responses developed, adversely-affected groups are likely to resist change and the potential gains from new technologies and international competition will not be realized fully, even though they may be much larger in the aggregate than the costs to those facing adjustment. Also, the American sense of fair play argues against letting a few bear relatively large individual costs so that the rest of us can enjoy relatively modest individual benefits. This argument takes on a sense of self-interest as well in a world where none of us can be sure that ours will not be the next job to become obsolete.

Finally, the short run adjustment costs associated with adapting to economic change may be excessive in the absence of appropriate government policies to mitigate their effects. If, for example, enough workers in industries that are contracting are unable to find, or unwilling to accept, new jobs, there may be an increase in structural unemployment that is not susceptible to a macroeconomic cure except at the cost of higher inflation. This will be so if workers in contracting sectors do not move to where new jobs are being created but a shortage of workers in expanding sectors puts upward pressure on wages there. Of course, there may simply be an offsetting reduction in structural unemployment in expanding sectors, in which case some workers' job prospects will get worse, but other workers' job prospects will improve. Unless this happens, however, a rise in the dispersion of employment changes across industries associated with an accelerating pace of structural change may increase the aggregate unemployment rate at which inflation is stable, leading policy makers to accept a higher level of unemployment than they would if the economy were changing less rapidly. If adjustment could be speeded up, the structural component of unemployment could be reduced and more output could be produced.

How many workers lose their jobs each year and face little prospect of getting them back? How severe are their adjustment problems? Has there been any significant increase in the number of such dislocated workers over time or is there likely to be an increase in the future? These are critical questions in any evaluation of the short run costs of adapting to economic change, but we have less data than we would like to have for answering them.

The most comprehensive data on dislocated workers comes from two surveys conducted by the Bureau of Labor Statistics in 1984 and 1986.[12] These data show that the number of adult workers with three or more years of job tenure who lost their jobs because of a plant closing or move, non-seasonal slack work, or the abolishment of their shift or position averaged about a million a year between 1979 and 1985. However, the losses for individual years varied between a low of 567,000 in 1979 (a year of high employment) and a high of 1.3 million in 1982 and 1983 when aggregate unemployment in the economy was very high.

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[12] In January 1984 and January 1986 special surveys were included in the current population surveys for those months. Respondents were asked if they experienced a job loss at any time in the preceding five years. and if they did they were asked to answer a number of follow up questions. See U. S. Department of Labor. Bureau of Labor Statistics, Displaced Workers. 1979-83. Bulletin 2240. July 1985; Devens. R. M.. "Displaced Workers: One Year Later." Monthly Labor Review. July 1986. pp. 40-43: U. S. Department of Labor, Bureau of Labor Statistics. "Reemployment Increases among Displaced Workers," Press Release. USDL 86-414. October 14. 1986. Most of the analysis in this section is based on the January 1984 survey, which covers 1979 through January 1984.

Several questions can be raised about the definition of a dislocated worker used to obtain these estimates. It may be too broad, for example, in including workers who have lost their jobs for cyclical reasons and may be rehired relatively quickly. When one restricts the definition to those who experienced more than 5 weeks of unemployment, the count of dislocated workers drops to about 800,000 a year; and when one restricts the definition to those who experience more than the 26 weeks of unemployment typically covered by unemployment compensation the number drops still further to 540,000 a year. On the other hand, the definition may be too narrow in excluding some among the long-term unemployed who originally became unemployed for some other reason or new entrants into the labor force who have difficulty finding a job.

On balance, however, the BLS definition seems to capture what we mean by a dislocated worker, although not all such dislocated workers experience serious problems finding new jobs. Comparing the number of dislocated workers experiencing more than 26 weeks of unemployment between 1979 and January 1984 (about 2.3 million) with an estimate of the total number of workers experiencing some unemployment during this period (about 57 million), Stone and Sawhill estimate that less than 5 percent of all workers experiencing some unemployment were dislocated workers in need of special assistance.[13]

Table 3 provides information about dislocated workers at the industry level. It is based on the 1984 survey and includes all dislocated workers as defined by the BLS. Results from the 1986 survey show a similar pattern across industries. The data in Table 3 show that the dislocated workers of the 1980s have come disproportionately from manufacturing and mining. Whereas the total number of dislocated workers represented

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[13] Stone and Sawhill, Labor Market Implications, p. vii, pp. 33-36.

Table 3
Dislocated Workers by Industry

	1979 empl't* (000)	Jan'84 Disloc'd workers (000)	DW as share of 79 emp't (%)	% of DW with jobs in 1984	% of DW with 20% wage loss **
agriculture, forestry, fisheries	3340	100	3.0	70	
mining	704	150	21.3	60	
construction	5879	401	6.8	55	24
manufacturing	21401	2483	11.6	59	31
Durables	12831	1675	13.1	58	35
Nondurables	8570	808	9.4	59	21
transportation, communications, utilti	5529	336	6.1	58	26
wholesale and retail trade	17454	732	4.2	61	21
finance, insurance, and real estate	5514	93	1.7	79	22
services	24492	506	2.1	65	
other	15832	273	1.7		
	97662	5074	5.2	60	27
MANUFACTURING					
Durable Goods					
Lumber and Wood Products	798	81	10.2	68	
Furniture and Fixtures	505	65	12.9	na	
Stone , Clay, and Glass	726	75	10.3	48	
Primary Metals	1319	219	16.6	46	52
Fabricated Metal products	1614	173	10.7	62	37
Machinery, except Electrical	2574	396	15.4	62	36
Electric and Electronic Equipment	2162	195	9.0	48	31
Motor Vehicles and Equipment	991	224	22.6	63	37
Transportation Equipment	1059	130	12.3	62	39
Instruments and Related Products	602	54	9.0	na	
Miscellaneous Manufacturing	635	62	9.8	na	
Nondurable Goods					
Food and Kindred Products	1763	175	9.9	53	
Textile Mill Products	861	80	9.3	60	
Apparel and Other Textile Products	1352	132	9.8	63	
Paper and Allied Products	708	60	8.5	na	
Printing and Publishing	1301	103	7.9	58	
Chemicals and Allied Products, exc	1111	110	9.9	64	
Rubber and Misc. Plastics Products	788	100	12.7	63	
Other Nondurables	532	49	9.2	na	
	21401	2483	11.6		

* includes part-time and self-employed
** percent of reemployed displaced workers

about 5 percent of total 1979 employment, the number of dislocated workers in mining represented 21 percent of 1979 mining employment and the number of dislocated workers in manufacturing represented about 12 percent of the 1979 manufacturing workforce. Although a large number of dislocated workers came from wholesale and retail trade and services, the number of such workers was relatively small as a percentage of all people working in those industries in 1979.

This was a difficult period for dislocated workers. The economy experienced back to back recessions in 1980 and 1981-1982, the latter the most severe recession since the Great Depression. Every year was characterized by a weak overall labor market and the problems of manufacturing workers were aggravated by the overvalued dollar. Transportation and communications industries were being restructured as a result of earlier deregulation initiatives. Even so, about 60 percent of those identified as dislocated workers in 1984 were reemployed at the time of the survey and more than two-thirds were reemployed a year later. Two-thirds of those identified as dislocated in the 1986 survey were reemployed at the time of the survey. Also, a majority of those who were reemployed received wages at least as high as they had received in their old jobs.

Thus, even in the turbulent labor markets of the early 1980s, the number of experienced workers who lost their jobs and had difficulty finding comparable new jobs represented only a small minority of all workers.[14] However, this was a period in which trade restraints slowed, but by no means prevented, adjustments in key industries like steel, automobiles, and textiles and apparel that might have raised the number of dislocated workers substantially during this period without such restrictions. Moreover, many of those who did lose their jobs remained unemployed for a long period of time or dropped out of the labor force entirely. Also, a substantial minority of dislocated workers who subsequently found new jobs had to accept wages that were less than 80 percent of the wages they earned in their original jobs. Finally, many of the dislocated workers who experienced large adjustment costs were experienced male workers with good technical and general job skills.

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[14] See Kosters, M. H., "Job Changes and Displaced Workers: An Examination of Employment Adjustment Experience," in Cagan, P., editor, Essays in Contemporary Economic Problems, 1986 (Washington, D. C.: The American Enterprise Institute), 1986, p. 302.

Unfortunately, we do not have data comparable to those from the BLS surveys for earlier periods and must rely on more indirect evidence to put the experience of the early 1980s into historical perspective. We can begin by noting that both the unemployment rate and economists' estimates of the unemployment rate consistent with stable inflation rates has shown an upward trend since the early 1950s. Furthermore, increases in unemployment in recent years have been concentrated among mature men, job losers, and the long term unemployed and cannot be explained away as due to measurement problems, demographic shifts, or cyclical factors[15] Second, both the number of workers "at risk" of losing their jobs because employment is shrinking in their industries and the number of jobs actually lost in contracting industries rose substantially during the 1970s. In 1972, for example, 16 percent of all workers were employed in industries that would suffer a decline in employment over the coming five years; in 1979, 25 percent of all workers were in such industries. The average drop in employment among declining industries was 1.6 percent between 1972 and 1977 and 3.3 percent between 1979 and 1984.

For the 1958-1979 period as a whole, however, variability in the number of workers at risk and in the number of jobs lost in declining industries can be explained largely by cyclical fluctuations in total employment growth. When cyclical effects are removed, there is no upward time trend in either of these indicators of potential adjustment problems.

In summary, dislocated workers seem to represent a small but important minority of all workers. Historically, there has been considerable cyclical variability in the number of workers in declining industries and the number of jobs actually lost in declining industries but there does not appear to be an underlying increase over time in the number of dislocated workers due to structural factors. It is impossible to know for certain whether the macroeconomic problems of the early 1980s have masked newly-emerging structural problems, but at least some of the dislocation identified in the BLS surveys would not have taken place without the extreme pressure put on manufacturing by the trade and exchange rate developments discussed earlier. If the economic recovery continues and the budget and trade deficits are brought under control, the dispersion of employment changes across industries is likely to be reduced. Manufacturing losses will be reduced and gains in the service sector will be smaller. However, the pace of structural change may yet accelerate with the development of new technology and greater international competition.

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[15] See Summers, L. H., "Why is the Unemployment Rate so Very High Near Full Employment?" Brookings Papers on Economic Activity, 2:1986.

Policy Implications

Pulling together the various topics discussed thus far, we conclude that structural change, especially structural change associated with the increasing internationalization of the American economy, is both inevitable and, on the whole, desirable. If other countries surpass us in per capita income it will be because they have invested more in capital accumulation, R&D, and education and training; it will not be because they have taken advantage of the openness of the U. S. economy or restricted our access to their markets. However, the more successful the United States is in remaining competitive in the world economy, the greater is the risk that some Americans will be left behind as the economy grows. These will be workers with limited job skills whose wages will be kept down by competition from unskilled workers in the rest of the world. whether indirectly through trade and the relocation of U. S. companies abroad. or directly through immigration. Even among skilled workers, there may be a greater risk of economic dislocation if the pace of economic change accelerates. How should policymakers respond?

Laissez Faire. Advocates of a laissez faire approach to adapting to economic change and international competition see no role for government policy. This approach is most attractive to those who are confident that there are no real underlying structural adjustment problems, that wage differentials reflect differences in tastes and preferences among workers with equal access to all jobs, and that workers and firms make rapid adjustments to changing market price signals. It is also attractive to those who are profoundly skeptical that the political process is capable of improving things even if these ideal conditions are not met. The laissez faire position also puts maximum emphasis on achieving freedom of choice and economic efficiency and it does not view the income distribution that results from the free play of market forces as a legitimate concern of public policy.

The laissez faire approach can be criticized on a number of grounds. It is weakest where a good case can be made that government policies can improve economic efficiency without unduly limiting freedom of choice. For example, if job search assistance lowers structural unemployment by enough that the extra output produced exceeds the cost of the assistance, there is a net increase in national income and a more rapid adjustment to economic change than there would be if there were no assistance program. The laissez faire position may also be unacceptable to those concerned with fairness if it leads to substantial and arbitrary redistributions of income from those with the bad luck to be in contracting sectors to those with the good luck to be in expanding sectors. If society is unwilling to let people's fortunes be determined entirely by their luck in the marketplace, it may be willing to sacrifice some economic efficiency in order to promote greater distributional equity.[16] Finally, a commitment to laissez faire ignores the political reality that those suffering from economic change actively seek relief through the political process; and the net effect of a series of "exceptions due to extraordinary circumstances" may create more inefficiencies than would be created if there were explicit policies in place for assisting those having to adjust to economic change.

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[16] To the extent that success in the marketplace represents good judgment and appropriate responses to market price signals it is to be rewarded. This discussion emphasizes the component of earnings that represents good or bad luck not good or bad judgment.

Reform existing programs. Whatever its merits or demerits, laissez faire has never been the defining feature of U. S. economic policy, even in the Reagan Years. Despite his free trade rhetoric, President Reagan has granted a number of special protection measures to industries hurt by imports, usually out of a concern that if such protection were not given the Congress would enact even more blatantly protectionist measures. Also, a notable feature of the President's 1988 budget was a request for a substantial increase in funding for programs addressing the problems of dislocated workers at the same time further cuts were being requested in most other nondefense programs. In both cases, Mr. Reagan is continuing a tradition of ad hoc and incremental responses that have produced a patchwork of programs that in one way or another address the problems of dislocated workers. Although most analysts have been critical of how these programs have operated in the past, many nevertheless see reform of existing programs as the best way of addressing the problems of adjusting to economic change.

Concern with the problems of dislocated workers is often inextricably bound up with concern over imports. One manifestation of this concern has been the establishment of an "escape clause" in U. S. trade law that provides a procedure whereby industries that feel they have been harmed by imports can petition for relief in the form of a tariff, quota, or some other form of protection. Responsibility for determining whether injury has indeed taken place and for recommending relief rests with the International Trade Commission (ITC), an independent federal agency. However, the President must then determine whether or not to take the recommended action. In important instances, however, including President Carter's instituting a "trigger price" mechanism for limiting steel imports and President Reagan's negotiation of a voluntary automobile export restraint agreement with the Japanese, the escape clause mechanism has been circumvented and special protection has been given to particular industries through other means.[17]

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[17] See Hufbauer, G. C., and Rosen, H. F., Trade Policy for Troubled Industries (Washington, D. C.: Institute for International Economics), March 1986 for a discussion of the several routes to special protection, especially Ch. 2.

Those who see the escape clause procedure as a pragmatic means for channeling concern over imports into appropriate channels criticize the current operation of the system for being too uncertain and too readily avoided.[18] They would prefer to see a system in which relief was certain upon proof of injury but also certain to expire after a fixed period of protection. They would also prefer all relief to take the form of tariffs. An equally restrictive tariff would make the costs of protection more transparent while at the same time generating government revenue that could be used to aid the adjustment process.

A second important feature of U. S. trade law designed to aid dislocated workers has been Trade Adjustment Assistance (TAA). TAA was established as part of the Trade Expansion Act of 1962, expanded and liberalized under the Trade Act of 1974, and then scaled back substantially in 1981 as part of the Reagan budget cuts. Between the time of its liberalization in the mid 1970s and its peak funding in 1981, $3.9 billion was paid out to 1.3 million recipients. TAA was designed to assist workers in industries where the Labor Department certified that imports contributed importantly to unemployment and to assist firms and communities where the Commerce Department made a similar certification. Workers were eligible for both generous cash allowances (70 percent of weekly wages for up to 78 weeks) and services such as job search, counselling, training, and relocation subsidies. There was, however, little use of the service components of the program.

TAA is now widely conceded to have been a failure.[19] Few people were served initially and a large number of those who were served ended up returning to their old employers, suggesting that the program was serving those facing temporary layoffs rather than those facing true dislocation. This experience with TAA calls into question the strategy of focusing on the cause of a job loss rather than its consequences in designing a program. Adjustment assistance programs are needed for those who face a permanent job loss and difficulty finding a new job, regardless of the cause of the job loss. Workers facing temporary earnings losses caused by import competition do not in principle have a greater claim on assistance than those facing temporary earnings losses for other reasons who are eligible only for unemployment compensation.

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[18] See, for example, Lawrence, R. Z. and Litan, R. E., Saving Free Trade: A Pragmatic Approach (Washington, D. C.: Brookings) 1986 and Hufbauer and Rosen, op. cit.

[19] See Stone and Sawhill, Lawrence and Litan, and Hufbauer and Rosen for more detailed discussions of TAA.

The United States has never had a systematic program addressing the problems of dislocated workers.[20] Unemployment insurance is meant to provide a financial cushion against income losses during temporary spells of unemployment but it was not designed to promote adjustment. Otherwise, we have had a changing patchwork of programs.

The Manpower Development and Training Act (MDTA), which operated from 1962 to 1973, was originally designed to address the problems of structural unemployment among adult workers, but it evolved into a program in which two-thirds of training positions went to youth and disadvantaged workers. The large literature evaluating this program suggests that training was effective in allowing participants to compete more effectively for existing jobs and to achieve more stable employment, though not generally at higher hourly wages or in more highly-skilled positions than they had before the training. Nor is there good evidence on whether the earnings gains initially afforded program participants (about $1300 a year in 1984 dollars) were maintained long enough to justify the program's costs.

The Comprehensive Employment and Training Act (CETA), which replaced MDTA in 1973 was the nation's major employment and training program until it expired in 1982, but it never served many dislocated workers. The current program is Title III of the Job Training Partnership Act (JTPA). Less than 100,000 people a year were served by JTPA through 1984, compared to the nearly half million dislocated workers per year who experience prolonged spells of unemployment. Moreover, JTPA is serving a somewhat higher proportion of women, minorities, younger workers, and better-educated workers than it is the prime-age white males who tend to be dislocated workers.[21]

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[20] The discussion that follows is drawn from Stone and Sawhill.

[21] See Stone and Sawhill, Labor Market Implications, pp. 36-37.

In an attempt to learn more about the best way to assist dislocated workers the Department of Labor funded seven pilot projects in the early 1980s and initial evaluations of their impacts are available for two of these projects. Both provided evidence that job search and placement assistance were successful in increasing participants' probability of being employed and in raising their earnings. Evidence of the benefits and cost-effectiveness of training was somewhat weaker.

Clearly, the United States has not had a systematic program to assist dislocated workers directly. Nor is it easy to draw lessons from the disparate set of programs that in one way or another have met some of the needs of some dislocated workers. The provision of cash assistance does not seem to promote adjustment, but, if properly targeted, does seem to compensate workers for the lower earnings they must frequently accept as the cost of adjustment. Programs offering a full range of training and job search assistance do seem to be successful, at least in the short run, for highly-motivated workers in relatively strong local labor markets. Job search assistance seems to be more cost-effective than training, and basic education seems to be as necessary as vocational training. However, the design of effective programs remains hindered by a lack of knowledge in areas as basic as identifying who are dislocated workers and evaluating the extent to which assistance programs actually lower the number of unemployed workers rather than simply giving program participants an advantage over non-participants in the competition for jobs.

Nevertheless, new approaches that build on what we have learned from past experience with training and assistance programs may be good policy--as long as the objective of such programs is to facilitate appropriate adjustments to changing economic conditions and not to thwart such adjustments. The failure of trade protection to revitalize domestic industries is becoming well-documented.[22] Policies that focus on the problems of workers and communities in adjusting to economic change are more likely to be successful than policies that try to provide protection for specific industries in hopes that they can become more competitive under the umbrella of protection. Policies that provide assistance in finding new jobs are more likely to be effective than programs that provide cash assistance in encouraging appropriate adjustments; but there may be a case for providing cash grants to those suffering large permanent income losses from otherwise beneficial realignments of production and employment.

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[22] See U. S. Congress, Congressional Budget Office, Has Trade Protection Revitalized Domestic Industries? (Washington, D. C.: U. S. Government Printing Office) 1986.

Radically Restructure the Role of Government. If the United States is indeed entering a new era of international competitiveness with the implications for earnings disparities and job security discussed earlier, we may want to rethink radically the way that workers are compensated and the role of government in providing income security. The proposals just discussed for reforming existing programs rely on government programs to identify dislocated workers and facilitate their adjustment to new jobs. An alternative approach would be to rely much more heavily on workers' own initiatives to choose how to adjust to changing conditions. The role of government would be to relieve workers of some of the concerns that could lead them to resist adjustment rather than accept the need to adjust.

Too great a disparity between the characteristics of "good" jobs and the characteristics of "bad" jobs can be an important barrier to adjustment. If people perceive that they cannot meet basic needs in low wage jobs and that such jobs offer little prospect of advancement to better jobs they may prefer to remain unemployed or work only sporadically at "bad" jobs hoping to get a "good" job, even though their qualifications for such jobs are weak. Similarly, workers who lose "good" jobs due to economic change may remain unemployed too long in hopes of getting a comparable "good" job rather than accept a "bad" job, even though their specific skills have become less valued in the labor market. If the United States is to take maximum advantage of technology and international competition to improve average standards of living, firms must be free to pay workers according to the value of what they produce and workers must be willing to accept the jobs for which their skills qualify them. At the same time, however, workers must be encouraged to develop their skills appropriately and workers willing to work hard full time must earn enough to enjoy a satisfactory standard of living.

Some of the changes arising from technology and increasing international competition that we have discussed will reduce the price of basic necessities like food, clothing, and many standardized manufactured goods, making it easier for low-wage workers to meet some basic needs.. In a wealthy society like the United States, however, the definition of a minimum satisfactory standard of living involves more than the ability to meet day-to-day basic needs. In particular it requires that people have reasonable insurance against a substantial drop in their standard of living that causes real hardship. Social security provides protection against a sharp decline in income upon retirement, and unemployment compensation provides insurance against income losses during temporary spells of unemployment. Antipoverty programs aim to prevent abject poverty. For the most part, however, workers are on their own to provide health insurance, supplemental retirement income, saving against emergencies, and education and training for themselves and their children designed to enhance their earnings capablilities or their resistance to becoming dislocated workers.

A characteristic of "good" jobs in today's economy is that many of these needs are met through employer-provided fringe benefits that are lost if the employee stops working for that particular employer. On-the-job training and wage profiles that pay workers more than the value of what they produce early and late in their careers and less than the value of what they produce in their peak-productivity years further tie good jobs to particular employers. The provision of fringes has tax advantages but it also frees workers from the risk of shortsighted decision-making that might result in inadequate purchases of the various kinds of insurance typically provided as fringe benefits if all compensation were received as wages. The time profile of compensation has advantages to the firm in attracting and keeping good employees but it also facilitates the smoothing out of expenditures over time.

"Bad" jobs, in contrast, provide lower wages, limited prospects for substantial increases over time, and limited fringe benefits.

In an economy in which good jobs are available to all and in which most workers who get a good job can expect to keep it or move to a comparable good job, most families can expect to have adequate health insurance, life insurance, pensions, education assistance, etc. provided as fringe benefits by the employer of the family member with a primary job. Secondary jobs will be just that--jobs that supplement family income but that do not need to provide a full range of fringe benefits. Reliance on fringe benefits to provide health insurance and other such expenditures is less satisfactory if there are many families in which no one in the family can qualify for a primary job or if many workers with specific skills that qualify them for primary jobs with good earnings and fringes face a substantial risk that suddenly they will be displaced from these jobs due to economic change.

One way to reduce the disparity between good jobs and bad jobs is to expand social insurance programs to include certain benefits now typically provided as fringes in most high-wage jobs but not provided at all in most lower-wage jobs. In principle, these fringe benefits are merely a different form of compensation from money, but in practice they are symbolic of good jobs. Perhaps more important, they relieve people from the risk of myopic decision making in which they let their health insurance lapse or do not make this year's IRA contribution because there is some more immediate expenditure to make.

Consider as an example of how these ideas might be implemented a system in which all compensation paid workers is in the form of wages except for the employer contribution to social security (employers would be free to provide fringe benefits but they would be taxed as ordinary income to the worker.) Workers who have paid into the social security system for the minimum required period are then eligible to participate in a program that provides refundable tax credits for a limited set of expenditures similar to those now provided as fringe benefits in good jobs. These would include health insurance, retirement saving, and education and training expenses, and they might include child care expenses.

The system would function as a targeted negative income tax. Those with low incomes would receive a subsidy for these kinds of expenditures, those with higher incomes would be net taxpayers despite the tax credit.

Such a system imposes no requirements on employers to provide a certain minimum set of benefits and it imposes no obligation on workers to purchase health insurance, a retirement account, or education and training. It does, however, provide good incentives in the form of a tax credit (stronger than a deduction) and the refundability provision allows for payments to households with particularly low earnings if such purchases are made. Because it imposes no obligations on employers, it encourages an efficient wage structure based on the value of output produced. With many necessities becoming cheaper and with assistance in meeting longer term income security needs provided through these tax credits, differences in earnings among different jobs will translate into differences in discretionary spending. Low wage jobs will not allow as many restaurant meals, fancy vacations, luxury automobiles, and housekeeping services, as high wage jobs, but they will not signify an inability to meet a minimal satisfactory standard of living. In this way, differences in wages can still encourage people to acquire the education and training necessary to get good jobs, but the difference between a high-wage job and a low-wage job can represent a greater or lesser ability to enjoy many discretionary expenditures rather than the difference between a satisfactory and an unsatisfactory standard of living.

The details of implementing the specific scheme discussed here have not been worked out in any detail, and there are bound to be practical difficulties that need to be overcome. The point of this discussion. however. is not to argue for a specific plan. but to suggest that such an approach might be needed if the U. S. is to be as successful as possible in adjusting to structural changes in the labor market that are likely to occur over the next several years.

Conclusions

This paper has examined the importance of changes in the industrial structure of the economy in determining changes in the distribution of earnings across individuals. Although we have expressed skepticism that America is becoming deindustrialized or that we are losing our ability to compete in world markets, we have cautioned against complacency. Although the average American will experience a higher standard of living if the economy is open to technological change and foreign competition than if it is resistant to change, there is some risk that a substantial minority will fail to participate in economic growth and that others will face the risk of being displaced from good jobs. To some this is simply the price that must be paid for economic growth. It has been argued here, however, that considerations both of fairness and of efficiency require that the U. S. improve policies to assist those bearing the short run costs of adjusting to economic change. One way is to improve existing programs that provide training and adjustment assistance to those who must adapt to economic change; but it may be time for a more radical restructuring of the way employees are compensated and the role of the federal government in providing social insurance in order to prevent individual workers from having to pay substantial individual costs so that the economy as a whole can achieve the benefits of technological change and international trade.

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